APPENDIX A

Brampton Human Health and Sciences Cluster Development Strategy

Leveraging Peel Memorial Centre for Integrated Health and Wellness

FINAL REPORT

April, 2017

Executive Summary

Introduction

At its core, this document focuses on the ways in which the City of Brampton can successfully develop a “cluster” – or expanding hub of economic activity, investment and job creation – in the human health and life sciences industries. The immediate trigger – both for this study and for the emergence of this cluster development opportunity – is the completion of Phase One of the Peel Memorial Centre for Integrated Health and Wellness (PMC). As the City and its various partners and stakeholders begin to consider Phases Two and Three of PMC development, and as they look to strengthen and deepen the positive impacts of a growing human health and sciences industry cluster on the community, this document serves as a roadmap and strategic plan.

To accomplish this goal, the document must achieve three objectives. First, it must articulate a clear, long-term vision for the human health and sciences cluster. Cluster development is a process of decades, not months or even years, and as a result, this study must lay out a distinct vision of what the community can achieve through its sustained efforts. Sections of this study seek to identify and describe the massive changes underway in the health and life sciences sectors, and to identify key areas of opportunity where Brampton is powerfully – and uniquely – positioned to attract investment, economic activity, and jobs.

In part, these opportunities relate to a shift from responsive and reactive approaches to medicine, to emerging approaches grounded in prevention and proactive service delivery. In part, they recognize the increasingly people-centred nature of the health care system, incorporating population-based research, genetics, and the active involvement of both individuals and communities. In part, they emerge from the increasing importance of health care apps, wearable technologies, and big data. In all instances, the report seeks to weave these threads together to describe a specific and significant set of interconnected economic opportunities, to create a vision of how the City of Brampton may pursue those opportunities, and to describe how success in these endeavours will change both the economic and built environments of the City.

The second goal of this document is to identify those actions that the City must undertake *today* to achieve that vision *tomorrow*. In a sense, the cluster development opportunity outlined here is a two-streamed opportunity. Achieving the full vision is process of 20 years or more – but success in achieving that future vision requires concrete and practical action in the here and now. In a sense, the journey to an economic cluster in 20 years begins with small and specific steps that must be taken today. To this end, the document lays out a tangible and targeted five-year action plan that will guide activity over the next few years. In part, this plan helps to shape the focus of PMC Phases Two and Three. At the same time, however, it lays out how action in the near term contributes to the realization of the fuller vision in the long term.

Finally, the document seeks to define a vision that will assist the City on assessing and evaluating other opportunities that are emerging – and will continue to emerge – as the City grows and evolves. Cities are faced with a constant array of challenges, opportunities and demands, and the decisions made about individual projects and initiatives have cumulative effects that can hinder or encourage future wellbeing and development. This document is also intended to provide guidance to the City as it confronts these many opportunities, and to support decisions that will strengthen and further the goals identified. How should transportation networks be shaped in the downtown core? What role does greenspace have in the emerging community? What kind of post-secondary partnerships should we seek and build? This document provides a vital tool for clarifying these (and many other) discussions and decisions, and for accelerating the development of both Brampton's human health and sciences industry – and the community as a whole.

Disruptive Innovations in Human Health and Sciences

The human health and sciences sector has been driven by research, science, innovation and technology for centuries. As scientific knowledge has grown and expanded, it has carried the field with it. Today, as disruptive innovation brings about further re-ordering of the sector through advancements in technology and knowledge, a radical restructuring of the health care system itself is also underway. Where for over 25 centuries many of the core activities of the human health and sciences space have revolved around the treatment of illness, injury and disease, it has only recently shifted from this largely reactive structure to one that is proactive and preventative.

The shift has led to increased interest in *outcomes-based* health care approaches. Rather than attempting to measure the success or value of health systems in terms of the numbers of treatments, procedures or patients, outcomes-based approaches assess success on the basis of disease prevented or interventions avoided. This represents a fundamental philosophical shift in how the human health and sciences sector is oriented, managed and directed.

It is possible to trace the emerging disruption of the human health and sciences industry to three primary factors:

- A financial factor, which sees massively rising health care costs forcing a fundamental reorientation of government and market supports
- A societal factor, through which communities begin to embrace proactive, outcomes-based approaches to health care rather than reactive, treatment-based approaches
- A technological factor, which builds upon emerging technology infrastructure in order to bring new apps, tools and knowledge to the sector

From an economic and community development perspective, being able to anticipate and prepare for periods of disruption can be a significant local advantage. Those individuals, companies, and communities that can grasp the changes underway and

respond with creative and innovative investments and support programs will rapidly outpace their peers or competitors who fail to note the dramatic changes underway.

It is within this context that Brampton can seek to make its mark and become an active participant in an integrated system that spans the Greater Toronto and Hamilton Area (GTHA) and Innovation Corridor that links the GTHA to the Waterloo Region. While Brampton concentrates on its position within a larger and more globally recognized regional context, it must also be cognisant of the fact that it need not entirely subsume its identity or goals into a larger, homogenized regional context. Rather, the regional approach requires that Brampton find a way to carve out a niche, and tell a unique and a compelling story about its special role within the larger regional cluster, and its role in advancing the human health and sciences landscape.

Purpose and Findings of the Report

As Brampton prepares for the inauguration of its most recent health care facility – the Peel Memorial Centre for Integrated Health and Wellness (PMC) – an opportunity emerges for greater development of the human health and sciences sector in the city alongside this modern beacon. It is within the emergence of this new facility that this report finds its purpose; to articulate a value proposition for further advancement of a human health and life sciences cluster in Brampton and a vision for what that process and elements of it look like.

Brampton's "value proposition" to investors in the sector rests on a number of key resources:

- A large number of successful human health and sciences companies are already located within the community, including leading multinational firms such as Medtronic
- New state-of-the-art ambulatory care facilities including the Peel Memorial Centre for Integrated Health and Wellness
- People-centred and population-based health science assets, including diverse population subgroups such as the South Asian community, and well-established medical support systems at the community level
- A central geographic position – supported by robust and growing transportation connections – linking the research capacity of downtown Toronto to the applied pharmaceutical, engineering and life sciences expertise of Hamilton and Waterloo
- Established links with post-secondary institutions active in the human health and sciences space, including McMaster University, Humber and Sheridan College in its own backyard
- Strong economic development and innovation support systems at the municipal, regional and provincial levels, with an established focus on human health and sciences
- A sufficient supply of desirable vacant and underdeveloped land, capable of supporting substantial growth in this sector

- A nimble and smaller Health System Network with progressive hospitals and leadership able and willing to adopt new models and new technology to improve both in- and out-patient care and foster an integrated approach to health

A vision for cluster development in the sector has at its nucleus the establishment of a health and technology campus, which constitutes the neighbourhood and municipal district surrounding the PMC site and the future phases of development anticipated for construction on its lands and in the surrounding area. Drawing on the above value proposition, the following Vision Statement serves to galvanize where the cluster aims to be in the future:

> *Our vision is that Brampton's human health and life sciences cluster continues to benefit from and leverage its geographic location and demographics, its growing connections to industry players and education institutions, and its forward-thinking advancements in technology, planning, and supportive governance, so that people both near and far may benefit from our innovative, impactful, and integrated approaches to human health and life sciences.*

This vision begins with the development phases of the PMC site itself; phase one nearing completion in early to mid-2017, phase two understood as hospital expansion space (as yet undetermined), and phase three representing roughly four acres of "partnership opportunity" space. Beyond this development is also anticipated throughout the surrounding district.

Yield analyses conducted of the health and technology campus anticipate the development of up to 25 buildings, some of which include mixed use commercial/retail/residential constructs. A total gross floor area for all 25 projects of over 383,000 square meters is projected, of which 60% will be residential. In order to support development of the cluster it is acknowledged that important considerations must be made about quality of life and quality of place attributes such as diversity of housing options and strong and integrated transit and active transportation infrastructure.

Analysis of existing water, wastewater and stormwater servicing has been conducted based on existing municipal documents and reports, and has concluded that existing infrastructure should be adequate to support development. Indeed, especially for stormwater systems, it was found that on-site stormwater quantity control and quality control measures for new developments will improve the existing storm drainage conditions, rather than contribute to strain.

In addition an assessment has been conducted concerning the economic impact of the health and technology campus over the next 25 years, based on real gross domestic product (GDP) and full-time, full-year (FTTY) equivalent jobs. Taken into consideration was the effect of each development on direct, indirect and induced GDP and jobs created. Importantly, not all GDP and job benefits are expected to affect Brampton solely. In fact, many circumstances may result in impacts affecting communities and businesses both locally as well as at broader scales. For example, construction workers may be commuting from other municipalities and not spending all their income directly in Brampton. Suppliers may be located in Brampton or

somewhere else in the region, the country or the world. Nonetheless, capital investment is expected to produce real economic results, be they local or broader. Key findings of the economic impact analysis include:

- Cumulatively, direct, indirect and induced real GDP are projected to total nearly $35 Trillion between 2017 and 2041
- Though slow to start, by 2031 GDP is expected to peak at approximately $1.937 Billion and remain constant at $1.9 Billion between 2031 and 2041
- The less direct the economic driver, the lower the GDP value, with direct GDP in capital expenditures peaking at $996.2 Million in 2030, indirect GDP reaching $521.2 Million, and induced GDP reaching $419.4 Million
- The impact on employment is also expected to peak in 2030 at 19,098 full-time, full year equivalent (FTYE) jobs (including direct, indirect and induced)
- Similarly to GDP, there is an inverse relationship between how direct the job is to the capital investment and the number of people employed, with 9,626 direct FTYE, 5,541 indirect FTYE and 3,910 FTYE jobs in 2030
- During construction phases, development charges can be expected to generate $124.8 million in revenue, while building permit fees will add an additional $14.5 million
- Property taxes from 2031 onward will generate approximately $16.4 million annually from residential and commercial rate payers

Recommendations

Consideration of the various analyses, best practice case studies, and background reviews that underpin this report and its accompanying technical appendix has resulted in a series of recommendations to guide cluster development in the human health and sciences space in Brampton.

In the interest of brevity the recommendations listed below are in summary format; however, further discussion of them and their context is available in section 6 of this report.

Recommendations are derived from a number of perspectives to inform the path to developing the health and technology campus. These perspectives include:

- **Development Concept Recommendations –** Recommendations pertinent to the conceptual development of the health and technology campus as a hub for the sector

- **Policy and Planning Development Recommendations –** Recommendations pertinent to ensuring municipal policies and planning are maximized to facilitate investment and development in the project area
- **Transit and Transportation Infrastructure Recommendations –** Recommendations pertinent to maximizing mobility, accessibility and the user experience (including the provision of amenities like benches, shelters and information systems) to and within the project area
- **Economic Development Recommendations –** Recommendations pertinent to ensuring economic development activities and capacity are sufficient to encourage growth and investment

	Recommended Initiatives	Lead	Priority Level (Within x Years)				
			Highest	High	Mid	Long Term	Ongoing
			Now	1	3	3 to 5	
Development Concept							
1	Concentrate office-based firms within a campus environment in order to encourage cluster development	Economic Development					
2	Initiate a “catalyst-project” with WOHS on Phase 3 lands in order to serve as an “innovation hub”	Economic Development					
3	Formulate partnerships between WOHS, Ministry of Health, City of Brampton, and private sector to initiate project	Economic Development					
Planning and Policy Development							
4	Integrate the health and technology campus into the Downtown Secondary Plan	Planning					
5	Designate lands immediately north of PMC as an additional part of the primary office node in the Central Area	Planning					
6	Density structure for mixed use along Queen, Centre, and Kennedy Rd. corridor amended to allow increased density	Planning					
7	Amend Section 5.1.3 to clarify Queen St. / Hwy 410 area is intended to be a primary office node, but, not the only one	Planning					
8	Amend Section of 5.4 of the Queen Street Plan or 5.3 of the Downtown Plan to permit office uses on the Phase 3 site	Planning					
9	Amend Central Area Mixed Use and Institutional Area to require active ground-floor uses along Lynch St.	Planning					
10	Identify transportation elements to include a future pedestrian/bicycle bridge over Etobicoke Creek, linking John St.	Planning					
11	Link Eastern Ave. to Clark Blvd, and plan for new local north-south streets to improve access to the future campus area	Planning					
12	Amend the Zoning By-law to add an exception to the Service Commercial provisions in the subject areas	Planning					
13	Implement more incentive programs for the health and technology campus lands, and potentially the broader downtown	Planning					
14	Encourage Peel Region to consider a regional CIP with financial incentives, such as a Regional DC Reduction program	Planning					
Transit and Transportation Infrastructure							
15	Feasibility study to improve active transportation infrastructure to enhance safety and access to/from PMC precinct	Transportation					
16	Consistent rules and signage be implemented at recommended primary pedestrian places to minimize conflicts between pedestrians and cyclists	Transportation					
17	Public Streets: City establish additional crossing points at regular locations based on a finer grid network	Transportation					
18	Implement laneways and informal routes improvements as prescribed in the recommendations	Transportation					
19	Expansion of cycling infrastructure in the city as per Bicycle Network recommendations	Transportation					
20	Vehicular Network: focus around providing the missing links within the road network and establishing a finer-grid	Transportation					
21	Undertake an EA for a proposed extension of Eastern Ave. between Hansen Road and Rutherford Road and advance the construction schedule	Transportation					

	Recommended Initiatives	Lead	Priority Level (Within x Years)				
			Highest	High	Mid	Long Term	Ongoing
			Now	1	3	3 to 5	
22	Transit Network: strategically reduce auto use in the area by undertaking a Transportation Demand Management program	Transportation					
Economic Development							
23	Dedicated role in economic development responsible for relationships in the Human Health and Sciences sector	Economic Development					
24	Establish relationships with local / regional companies that have incorporated the new outcomes based model of health	Economic Development					
25	Establish a plan of action for working with William Osler Health System to activate development on the Phase 3 site	Economic Development					
26	Ensure that economic development management and leadership is integrated into all urban planning and design	Economic Development					
27	Economic development leadership should participate in / guide strategies related to university campus development	Economic Development					
28	Attract health practitioners / companies looking to nest in an area focused on prevention and integrated health delivery	Economic Development					
29	Develop an international program with targeted countries connected to local, unique competitive advantages	Economic Development					
30	Direct stage two growth companies looking for affordable space in the next 3-4 years to consider Brampton for location	Economic Development					
31	Develop a marketing plan outlining target audiences, how to reach them, and messaging to ensure a unified approach	Economic Development					
32	Leverage momentum gained from this project to keep stakeholder and industry interest high and supporters engaged	Economic Development					

Contents

1 Establishing a Vision for a Human Health and Science Cluster

1.1 Economic Context

The emerging economy of the 21st Century is fundamentally reordering the opportunities facing businesses, workers, and communities. Technology, information, knowledge and innovation are creating a range of new economic forces that are eroding traditional industries and sources of employment, and pushing communities to reinvent their economic development objectives. In part, this is because of the disruptive effect that some emerging technologies have on established industries.

The first key thinker concerning the impact of innovation on the field of economic development was the Austrian economist Joseph Schumpeter (1883-1950). In his 1942 book *Capitalism, Socialism and Democracy*, Schumpeter described the concept of "creative destruction" which he defines as the "process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one."

Put simply, Schumpeter envisioned an economy that is never at rest. Entrepreneurs launch business ventures based on a product or service that they believe will appeal to the marketplace. Those that are successful will come to control a certain portion of that market, from which they derive their income. However, no company can ever count on retaining that market in perpetuity – new companies or competing companies started by other entrepreneurs will also be seeking to gain control of markets. To do so, they will frequently seek to employ innovative products, technologies, processes or even marketing tools in an attempt to wrest market share away from established firms. In this environment – both creative and destructive at the same time – companies that can consistently innovate will thrive and grow, while companies that are unable to innovate will decline, and potentially be replaced by new or growing competitors.

At any given moment in time, argued Schumpeter, some companies are failing, while others are growing. In essence, the "creativity" of the innovating companies prompts the "destruction" of the lagging companies. Only by innovating and expanding market share can companies create jobs, pay more taxes and spur local economic growth.

However, by the 1990s, the emergence of a new kind of "knowledge economy" began to prompt a reconsideration of innovation and its potential impact on economic growth and development. One of the leading figures in this discussion has been Clayton Christensen, who began discussing the idea of "disruptive innovation" in his 1995 article "Disruptive Technologies: Catching the Wave." Like Schumpeter, Christensen believed that innovation and the development of new technology was an ongoing

process, constantly reshaping industry. However, he also recognized that certain innovations had much broader and wider impacts than others, and therefore had the potential to upend existing business models in a much more substantial way.

Christensen used a historical perspective, arguing that technological innovations such as the introduction of agriculture, the invention of the printing press, or the development of the steam engine fundamentally reshaped not just individual companies, but entire economies. Writing in the 1990s, he connected the notion of disruptive technologies to the emerging technologies of the day, including personal computing, desktop printing, and the Internet.

Christensen was not merely interested in new technologies, but in their wider impacts on economies and communities. He argued that individual technologies are often simply a starting point for widespread disruption; it is, in fact, the careful and considered application of these technologies to the marketplace that creates the actual disruption. For example, the Internet existed (in a limited form) as far back as the 1960s as a tool for academic and military institutions, but it only became a disruptive innovation in the 1990s when companies and entrepreneurs began to develop new consumer markets and products by leveraging this existing technological structure.

To help differentiate individual technologies form the wider impacts he was interested in, Christensen described two kinds of innovation in his 1997 book *The Innovator's Dilemma*:

- Sustaining Innovations, which may by virtue of incremental innovation change the operations or performance of individual companies (as per Schumpeter), but which do not fundamentally alter markets
- Disruptive Innovations, which have the power to destroy existing markets or create new ones, and are much wider and deeper in their overall social, cultural and economic impacts

Christensen has argued that the world is entering a highly disruptive period, when most – if not all – industries are undergoing high levels of disruption. By extension, he suggests that companies, workers and communities must proactively understand how their target sectors will change and evolve as a result of these forces. In this current environment, status quo approaches and strategies are doomed to fail. Only by embracing new and highly innovative strategies can they hope to achieve success.

1.2 Sector Context

The human health and sciences sector of the economy has been driven by research, science, innovation and technology for many centuries. However, the science behind the sector has always been a reflection of the dominant scientific paradigms of the day. In the ancient world, herbalists drove medical research. In the Renaissance era, this task fell to alchemists. During the 20th Century, microbiologists and chemists were among those who played a key role in advancing the sector. As scientific knowledge grew and expanded, it carried the field of human health and sciences with it. In some sense, the modern medical,

pharmaceutical and health industries have emerged from a centuries-long building process, in which generation after generation has built upon the efforts of its predecessors. Nowhere is this more clearly expressed than in the doctor's Hippocratic Oath, in which medical practitioners espouse a vision of healthcare first articulated 2,500 years ago.

Today, however, it seems increasingly likely that disruptive innovation – which has already upended massive industries from manufacturing to communications to transportation – will fundamentally alter and reorder the human health and sciences sector. Rapid advanced in fields such as genomics, biotechnology, immunogenetics, and proteomics are already transforming the sector. However, observers are just beginning to understand the disruptive forces poised to transform the sector. And, in the nature of disruption, this change will be about more than just a series of new tools and technologies – it will be about a radical restructuring of broader health systems.

For more than 25 centuries, many of the core activities of the human health and sciences space have revolved around the treatment of illness, injury and disease. One of the most basic tenets of the health care landscape is that when individuals are sick or wounded, they seek assistance from a medical practitioner. That medical expert may prescribe medicines, perform surgery, offer counselling, or offer some other response to the patient's medical situation. However, in pursuing this approach, the human health and sciences space has, in many ways, become a "responsive" system. It *responds* to medical issues or challenges, and seeks to treat existing symptoms or problems. It is, in many ways, a *reactive* structure, designed primarily to care for the ill.

In fact, much of the current health care system has been founded upon this responsive model. Doctors are often compensated based on the number of patients they treat. Hospitals are often funded on the basis of patient load, or on the volume of procedures performed. Over time, this system has unquestionably led to the creation of many ground-breaking treatment regimes, powerful pharmaceutical tools, and innovative surgical procedures. However, it has also come at an increasingly staggering cost, both in real dollar terms, and in its wider impact on economies and communities. Today, health care costs account for more than 50% of the budget of most Canadian provinces. Across the industrialized world, health care spending consumes between 11% and 18% of Gross Domestic Product (GDP). Global health care spending topped US$8.4 trillion in 2015, and will more than double to $18.3 trillion by 2030.

The financial costs of our current health systems are not merely limited to the actual operating costs, however. The responsive nature of past health care approaches, while effective in treating illness after the fact, is often markedly less effective at preventing disease or illness. That is, in being *reactive*, it fails to be *proactive* and *preventative*. It is estimated that chronic disease alone will cost the global economy more than $47 trillion in lost productivity between 2015 and 2030. The growing recognition that current systems and approaches are missing the mark is leading to a new interest in *outcomes-based* health care approaches. Rather than attempting to measure the success or value of health systems in terms of the numbers of treatments, procedures or patients, outcomes-based approaches seek to assess their success on the basis of disease

prevented, or interventions avoided. They seek to award funding based on the most effective preventive initiatives, or the healthiest communities. This represents a fundamental philosophical shift in how the human health and sciences sector is oriented, managed and directed.

Of course, part of the reason this re-orientation to outcomes-based approaches is even possible is that rapidly evolving technology is beginning to permit research, knowledge development and service delivery in ways that were previously unimaginable. The rise of big data means that researchers can begin to assemble massive datasets, large enough to genuinely understand and even predict the outcomes of certain courses of activity. This applies to medical intervention, certainly, but also to exercise, dietary, or social service interventions as well. For the first time, researchers are beginning to glimpse not only how to treat a disease, but how most effectively to prevent it as well. This revolution is being paralleled and amplified by the rise of personal health apps, often powered by ubiquitous smart phones or wearable technologies (such as Fitbit) that allow patients to monitor and record their own health, physical activity, diet, or use of medicines, while simultaneously providing accurate information to physicians and other caregivers about patient behaviour.

This ever-growing digital stream of health information is quickly beginning to converge with other technological advancements. Parsing this data by gender, age, or ethnicity suddenly begins to allow insights that will promote highly targeted or *personalized* health care, including the advent of personalized pharmaceuticals. As the use of Bluetooth communications technologies expands into the medical device industry, more data becomes available, but the ability for multiple nodes of data and support to interact in a virtual environment emerges. When this Bluetooth capacity connects to the Internet of Things (the increasingly hyper-connected world where all systems, appliances, tools and structures are connected to each other through the Internet), health care and life sciences leave the hospital and the laboratory, and spill out into the community. This creates a world in which healthcare is provided primarily on an outpatient basis (rather than the current inpatient model), and in which medical facilities are based on ambulatory (as opposed to chronic) care.

Ultimately, then, it is possible to trace the emerging disruption of the human health and sciences industry to three primary factors:

- A financial factor, which sees massively rising health care costs forcing a fundamental reorientation of government and market supports
- A societal factor, through which communities begin to embrace proactive, outcomes-based approaches to health care rather than reactive, treatment-based approaches
- A technological factor, which builds upon emerging technology infrastructure in order to bring new apps, tools and knowledge to the sector

The cumulative impact of these three transformative forces will be a far-reaching reorganization of the entire human health and sciences sector.

From an economic and community development perspective, being able to anticipate and prepare for periods of disruption can be a significant local advantage. Those individuals, companies, and communities that can grasp the changes underway, and respond with creative and innovative investments and support programs, will rapidly outpace their peers or competitors who fail to note the dramatic changes underway. This is not to suggest that a community like Brampton can suddenly declare itself the global centre of a disrupted human health and sciences universe. However, by understanding what key assets it has in place, how its value proposition relates to that of the larger economic region, and by employing the advantage of "first move", a community such as Brampton may achieve significant success in this field.

1.3 Community Economic Development Context

Globally, the human health and sciences sector is seen by regions and municipalities as a highly desirable source of investment and economic development. The competition for this investment is intense and widespread, and Brampton – though it may be a substantial community in the Canadian context –is not widely known, nor is its *value proposition* for international investors in this space well understood. In part, this means that opportunities for Brampton to "go it alone" and attempt to become a global sector leader will be very costly, or very unsuccessful – and quite possibly both.

Instead, Brampton should concentrate on its position within a larger – and more globally-recognized – regional context. The Greater Toronto Area (GTA) is both a community with a high international profile, and one that is recognized as home to North America's third-largest human health and sciences cluster. This cluster employs nearly 40,000 people, including 9,500 researchers and research staff who benefit from more than $1 billion annually in research funding at the region's universities and hospitals. More than 50 multinational firms in the sector are headquartered in the GTA, and many other multinationals have chosen the community as a base for Canadian or North American operations. By associating itself with this larger regional success story, Brampton enhances its credibility with potential investors, and finds itself at the centre of a much more compelling story about sector opportunities.

However, by positioning itself as part of a larger regional play, Brampton need not entirely subsume its identity or goals into a larger, homogenized regional context. Rather, the regional approach requires that Brampton find a way to carve out a niche, and tell a unique and a compelling story about its special role within the larger regional cluster. In other words, as Brampton seeks to attract investment, what particular focus or set of targets will allow it to build upon the GTA's coherent regional message, while differentiating itself from others by pointing toward a specific vision of the specialized role the community can play within the regional cluster?

Other GTA communities have had some success in this regard. Mississauga, for example, has earned the "Pill Hill" sobriquet, and positioned itself as a pre-eminent destination for pharmaceutical investment. Toronto, with its massive research hospitals

and university-based research expertise, is really the region's "Discovery District", where pure research is a key strength. Portions of York Region, including Markham, have been seeking to identify themselves as centres of medical device manufacturing, while more recently Scarborough and the east end of Toronto have being making a play to claim status as a centre of holistic and alternative medicines.

There are two lessons that can be drawn from this activity. First, it would be counterproductive for Brampton to try to compete in some of these niche sub-sectors that have already been "claimed" by neighbouring communities. But second – and more importantly – no community has yet begun to identify and pursue the massive and emerging opportunities in outcomes-based human health and sciences, or in related technical fields including big data, health apps, population-based research, ambulatory care, and personalized medicine. In targeting this space, Brampton is able to augment the GTA's regional value proposition, and find a target niche that contributes to and builds upon its neighbours' efforts rather than competing with them. Brampton also becomes a "first mover" in looking at and pursuing opportunities related to one of the biggest sector opportunities available. Not only does this approach provide the community with an appropriate starting point for a more targeted economic development operation, but it lays the foundation for community leadership in a sector where significant and impactful growth can genuinely transform the community, its infrastructure and its opportunities.

1.4 The Brampton Context

By articulating its strengths within a larger regional offering, Brampton will likely achieve greater levels of success in attracting human health and sciences investment to the community. At the same time, Brampton will need to develop a clear and concrete sense of its key assets to underpin this activity. In its current state, Brampton's "value proposition" to sector investors rests on a small number of key resources:

- A large number of successful human health and sciences companies already located within the community, including leading multinational firms such as Medtronic
- New state-of-the-art ambulatory care facilities including the Peel Memorial Centre (PMC) for Integrated Health and Wellness
- People-centred and population-based health science assets, including diverse population subgroups such as the South Asian community, and well-established medical support systems at the community level
- A central geographic position – supported by robust and growing transportation connections – linking the research capacity of downtown Toronto to the applied pharmaceutical, engineering and life sciences expertise of Hamilton and Waterloo
- Established links with post-secondary institutions active in the human health and sciences space, including McMaster University, Humber and Sheridan College in its own backyard

- Strong economic development and innovation support systems at the municipal, regional and provincial levels, with an established focus on human health and sciences
- A sufficient supply of desirable vacant and underdeveloped land, capable of supporting substantial growth in this sector
- A nimble and smaller Health System Network with progressive hospitals and leadership able and willing to adopt new models and new technology to improve both in- and out-patient care and foster an integrated approach to health

The current project adds to this value proposition by outlining a range of additional assets and strengths below that can be developed over time, including:

- Additional physical space and state-of-the-art facilities designed to accelerate the growth of this sector in Brampton, including phases two and three of the PMC site development
- Incubation space focused on anchoring and attracting young companies and entrepreneurs in the health app, big data, and digital health fields
- Expansion space targeting phase two growth companies from the Discovery District in Toronto, as they contemplate the move out of research and incubation spaces into larger facilities in more cost-effective locations
- Expanded initiatives to engage the local and regional population in outcomes-based health research, activity and service delivery, with a particular eye to demonstrating Brampton's capacity to mobilize key ethno-cultural groups within the broader population
- Targeted initiatives to develop key international partnerships – especially with India - with a focus on population-based and outcomes-based approaches to human health research and health care delivery
- Closer connections with key private sector actors in the community, including more robust partnerships with Medtronic and other firms positioned to play a lead role in Brampton's transformation
- Opportunities for leveraging the proposed presence of a university campus in Brampton to enhance both the physical and built environment, and the intellectual and training systems which may be aligned to support broader development of the human health and sciences sector

Overall, this current project will provide a clear vision as to how these varied elements may come together in a single, concise vision for community development. The report will explain the land use and infrastructure implications of this vision, and the potential impacts and financial outcomes of pursuing this course of action. The direction identified will not be a quick win for Brampton – it will require concerted and sustained effort over an extended period of time. However, if the community chooses to pursue this vision, it is a course of action that can bring significant growth, development and opportunity to the city.

1.5 A Vision for Human Health and Life Sciences

Drawing on the above value proposition and emerging assets and strengths, the following Vision Statement serves to galvanize where the cluster aims to be in the future:

> *Our vision is that Brampton's human health and life sciences cluster continues to benefit from and leverage its geographic location and demographics, its growing connections to industry players and education institutions, and its forward-thinking advancements in technology, planning, and supportive governance, so that people both near and far may benefit from our innovative, impactful, and integrated approaches to human health and life sciences.*

2 Observations and Findings

2.1 Literature Review

A number of existing background documents and studies were reviewed to provide a contextual lens as to what policies currently exist and the work that has already be completed or initiated as it relates to positioning Brampton in its pursuit of developing a sustainable health and human health and sciences hub. These background documents have been reviewed to provide an understanding of the context and current performance of the life science sector in Brampton as well as the current structure. They also highlight the opportunities present in developing a life science hub within and surrounding the Peel Memorial Centre for Integrated Health and Wellness (PMC).

One of the main themes that emerged from this process was the importance of developing the PMC and surrounding area to be attractive, not only to potential businesses, but also to residents, future researchers and innovators, and knowledge based workers. This means ensuring a walkable and vibrant community that provides availability for mixed use development such as retail, community services and office development. By initiating "place making" for the PMC and surrounding community, Brampton can begin to attract the development and workers needed for a broader human health and sciences sector. Another theme that emerged is the importance of attracting a university campus or developing partnerships with nearby post-secondary institutions in order to increase the intellectual appeal and higher learning systems that draw creativity, entrepreneurship, and talent development. As these documents highlight, universities are increasingly identified as a central asset in the development of industry clusters, where having one located in Brampton can support and foster knowledge transfer, product development, and commercialization efforts.

Finally, another common theme that emerged is that in Brampton itself, industrial clusters related to health and wellness are currently rather small and potentially underdeveloped. However, the documents identify that there are several factors that offer opportunities and may support future development of a human health and sciences cluster. This includes: a relatively large labour force working in occupations and support occupations in health care; proximity to post-secondary institutions with programs related to technical support in health care services and two universities with a medical doctor program, all offering opportunities for collaboration and supply of new graduates; and existing private sector firms with a strong focus on health-related research and development activities.

The documents and studies reviewed include:

- Peel Memorial Centre for Integrated Health and Wellness (PMC) William Osler Health System: Urban Design Guidelines (2013)
- A Vision and Plan for Queen Street East Corridor and New Community: Urban Design Concept Plan (2011)
- City of Brampton: Economic Development Plan (2015)
- Office Strategy for the City of Brampton (2016)
- Moving Our City Forward: 2016-2018 Action Plan (2016)
- Economic Impact Statement, Major University Capacity Expansion – City of Brampton (2015)
- Innovative Regional Economies and Strategic Infrastructure: The Business Case for Two-Way Urban Commuter Rail on the CN North Mainline (2015)
- William Osler Health System Business and Economic Opportunity Study: Economic and Market Analysis (2010)
- William Osler Health System Business and Economic Opportunity Study: Summary Report (2010)
- Central Area Community Improvement Plan (2013)
- Queen Street Corridor Secondary Plan (2013)
- Sustainable Community Development Guidelines (2013)
- Official Plan for the City of Brampton 2006 (Office Consolidation 2015)

2.2 Brampton's Human Health and Sciences Sector

Using data from Brampton's business directory (which tracks organization by NAICS codes) a search was conducted within the database for all existing businesses in Brampton that matched any core and non-core NAICS codes and which were directly associated with human health and sciences.

Figure 1 **Error! Reference source not found.**shows the distribution of local businesses that fit the core human health and sciences cluster in Brampton, summarized at the four digit NAICS level.

FIGURE 1: CORE HUMAN HEALTH AND SCIENCES ENTERPRISES IN BRAMPTON, ONTARIO

Core Life Science Sectors	Businesses
Pharmaceutical and medicine manufacturing	5
Navigational, measuring, medical and control instruments manufacturing	2
Medical equipment and supplies manufacturing	8
Pharmaceuticals, toiletries, cosmetics and sundries merchant wholesalers	0
Other machinery, equipment and supplies merchant wholesalers	5
Architectural, engineering and related services	5
Management, scientific and technical consulting services	4
Medical and Diagnostic Laboratories	26

Source: City of Brampton, 2015.

Figure 2 demonstrates the non-core life science enterprise distributions identified in Brampton's Business directory.

In addition there are also the following educational institutions that have affiliations with the health care sector, and human health and sciences more distantly.

- Universities (Medix College)
- Technical and Trade Schools (ABC First Aid and CPR Training)
- Educational Support Services (Erin Oak Kids)

The distributions of the core and non-core human health and sciences industries are shown on the maps in Figure 3Figure 3: and Figure 4, where the former represents a map of Brampton and the latter map represents more specifically the downtown study area. All core sub-categories are shown with corresponding coloured dots for each. All non-core services are labelled "Health Services" with a corresponding pink dot.

FIGURE 2: NON-CORE HUMAN HEALTH AND SCIENCES ENTERPRISES IN BRAMPTON, ONTARIO.

Non-Core Life Science Sectors	Businesses
Offices of physicians	208
Offices of dentists	209
Offices of other health practitioners	224
Out-patient care centres	4
Home health care services	9
Other ambulatory health care services	10
General medical and surgical hospitals	1
Psychiatric and substance abuse hospitals	0
Specialty (except psychiatric and substance abuse) hospitals	1
Nursing care facilities	8
Residential developmental handicap, mental health and substance abuse facilities	1
Community care facilities for the elderly	9
Other residential care facilities	7

Source: City of Brampton, 2015.

FIGURE 3: MAP OF CORE AND NON-CORE LIFE SCIENCE ENTERPRISES IN BRAMPTON, ONTARIO.

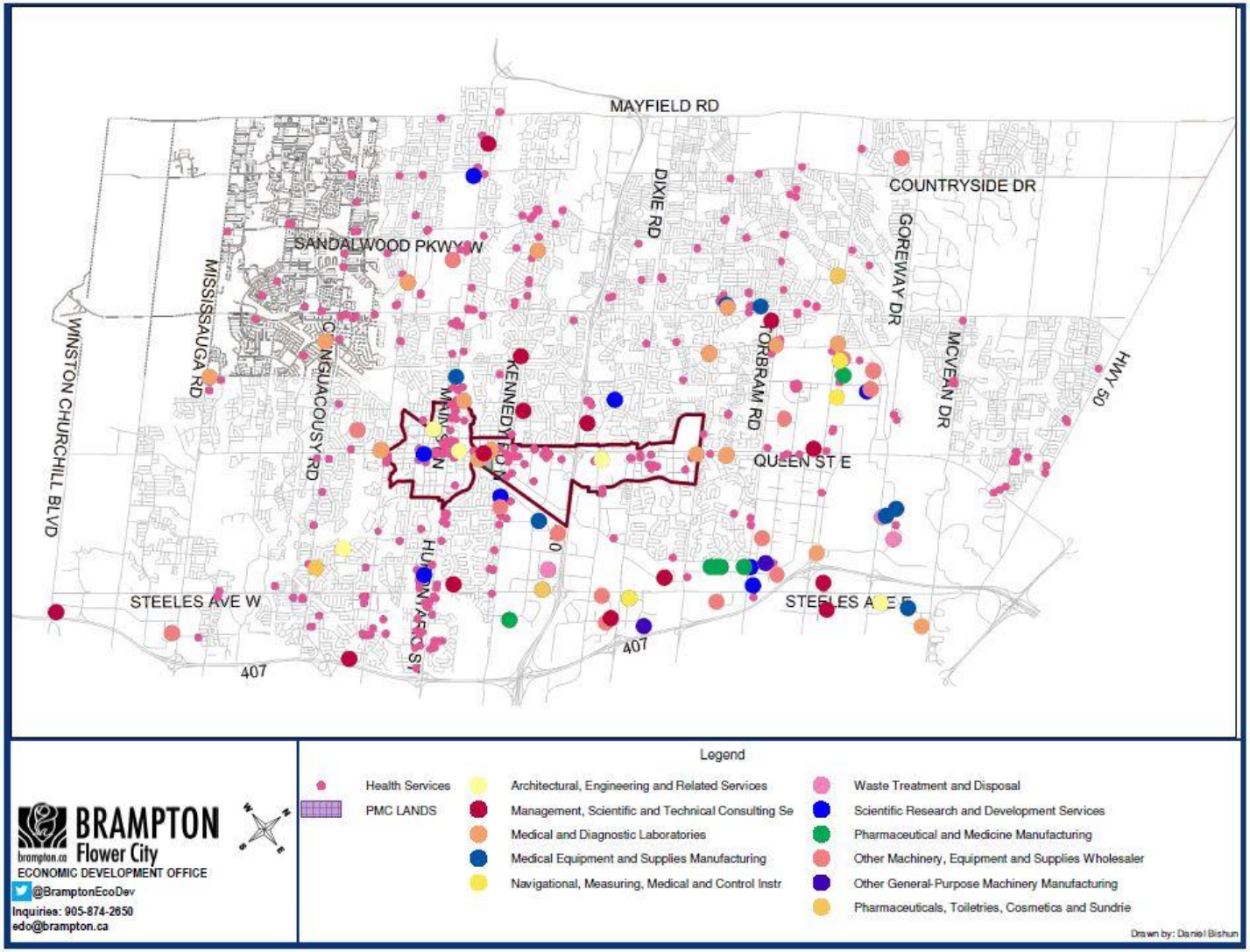
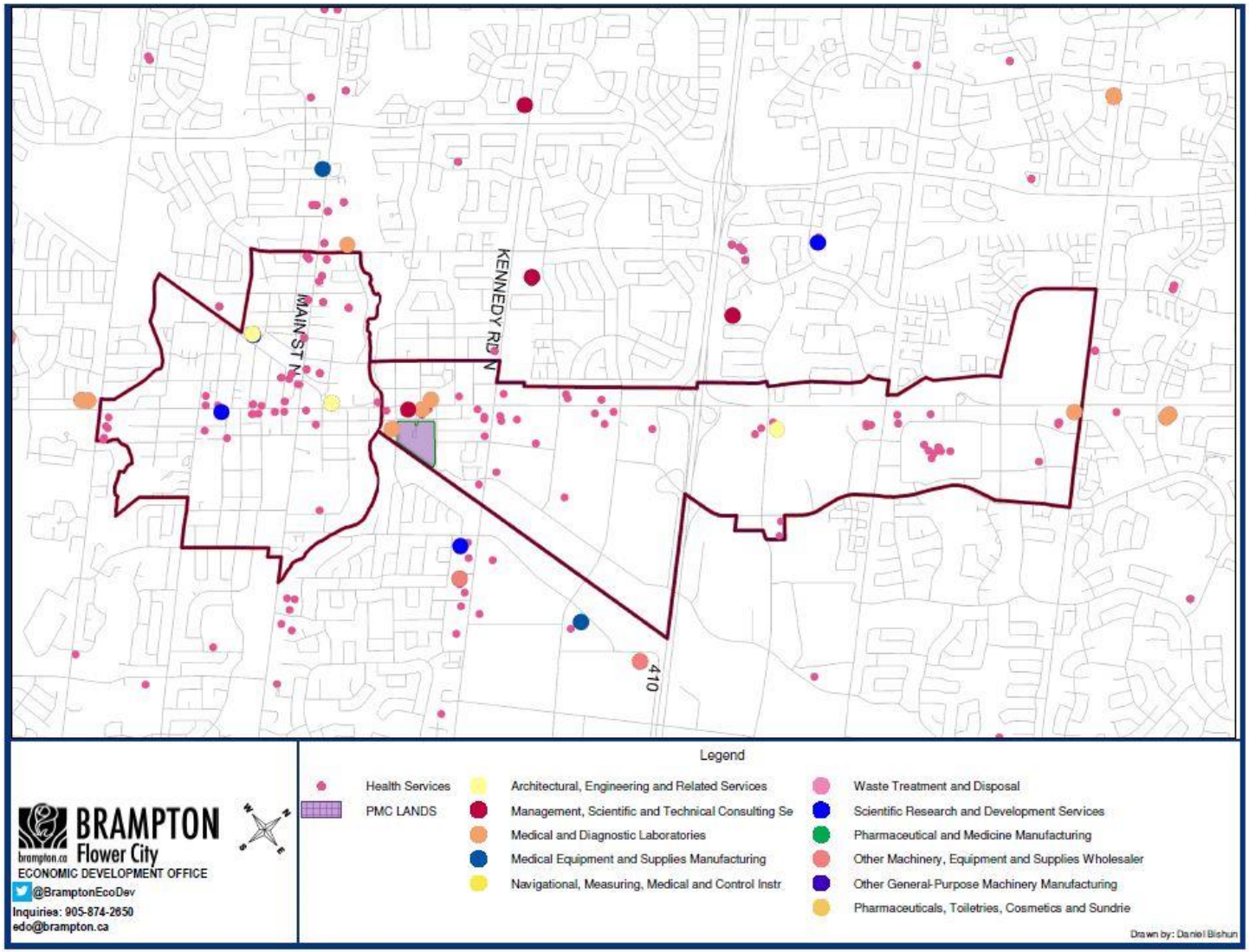


FIGURE 4: MAP OF CORE AND NON-CORE LIFE SCIENCE CLUSTER IN DOWNTOWN STUDY AREA.



Key Learnings from Brampton's Human Health and Sciences Sector

The existing core life sciences cluster in Brampton is defined predominantly by its strengths in medical and diagnostic laboratories, but also shows some presence in pharmaceutical and medicine manufacturing, medical equipment and supplies manufacturing, other machinery, equipment and supplies merchant wholesalers, and architectural engineering and related services. An area where no enterprise was observed in the business registry was in the pharmaceuticals, toiletries, cosmetics and sundries merchant wholesalers.

In the downtown study area, aside from a high concentration of non-core health services, there is an existing cluster of medical and diagnostic laboratories, with additional facilities located just outside its perimeter. Moreover, two medical and diagnostic laboratory locations are adjacent the PMC grounds which are being developed. There are also three architectural, engineering and related services within the study area.

Brampton has been losing ground to growth in life sciences businesses in the GTHA. Most industry in Brampton has either remained of similar levels over the years or has been in decline relative to the provincial distribution as well as regions within the GTHA. The Peel Region, of which Brampton is a part, holds some indication of strength in location quotient, which suggests industry strengths as well; however, overall the regional leader is Halton. Looking at Mississauga, it is clear that the area is a leader in core life sciences, which confirms that Brampton's lagging performance has resulted in an overall lag for Peel Region in comparison to Halton (which includes such strong manufacturing and distribution hubs such as Oakville and Burlington).

Despite aggressive marketing campaigns by Brampton's neighbouring municipality of Mississauga, overall the Peel Region, of which Brampton is a part, only leads Halton in two industry sub-sectors. These areas are both in the distribution component of the business cluster; Pharmaceuticals, Toiletries, Cosmetics and Sundries Wholesaler-Distributors and Other Machinery, Equipment and Supplies Wholesaler-Distributors. A possible explanatory is that although Mississauga may have strong life science activity, Brampton's activity is largely on par with provincial distributions or under-represented, revealing a local gap in performance in the life science sector.

Additional findings indicate a significant outflow of labour in health-related sectors. While a total 19,897 Brandon residents worked in the broader human health and sciences sector, only 11,425 people worked in the sector in Brampton. This means at least 8,472 locals are working outside of Brampton. These represent potential to accommodate more related industry in Brampton because of the available labour force. Importantly, the more often residents leave a city to work in another location, the more likely they are to spend more money outside of their own community, resulting in economic leakage. Building a healthy cluster locally will ensure more local residents make the decision to work in Brampton, in addition to attracting labour from outside the city that may also eventually choose to live in Brampton.

2.3 The Human Health and Sciences Ecosystem

To be sure the GTHA's human health and sciences cluster is a world recognized stronghold. The human health and sciences cluster ecosystem includes the GTHA and the corridor through the Kitchener-Waterloo region. A number of categories which primarily include the following industry sub-sectors can characterize it:

- Pharmaceuticals and Nutraceuticals
- Medical Devices
- Knowledge Capital
- Health ICT and Big Data

The term ecosystem entails that these different components interact and overlap in varying ways. Below they are discussed thematically, but it is also acknowledged that the interplay between them is significant and can even be understood as a space for innovation and business opportunity.

Pharmaceuticals and Nutraceuticals

The pharmaceutical industry in the region is perhaps the most visible component of the human health and sciences ecosystem, which also includes aspects such as biomedical development and natural health products. Mississauga is commonly viewed as the dominant location for pharmaceutical and nutraceutical R&D and production, as the nickname Pill Hill implies. Its growth in this sector is a product of sustained and long-term brand creation and investment attraction activities which continues to carry momentum.[1] Toronto itself is also a leader in the sector, and actually has more companies than Mississauga does (following only Montreal).[2] Nonetheless, Mississauga's brand has grown in recognition. Mississauga also is a stronghold for nutraceutical manufacturers, such as Pharmaline. Other areas such as Oakville and Burlington are also gaining ground in pharmaceutical and nutraceutical manufacturing.

A major trend expected to continue to affect the sector is the "patent cliff", which reached peak effect in 2014, but is expected to have sustained impacts on the GTA (and the global sector more broadly), due to the largest wave of patent expiration in history.[3] This has begun to change the way brand name pharmaceutical manufacturers approach existing and new space

[1] City of Mississauga, 2002, "Mississauga: A Leading Canadian Bio Cluster," p.7; .City of Mississauga, 2007, "Life Sciences Focus: A profile of Mississauga's Life Sciences Cluster," p. 5.

[2] Ibid.

[3] JLL, 2014, "Life Sciences Cluster Report 2014," p.79.

requirements, and is closely connected to corporate “right sizing” (downsizing human resource and physical space to increase competitiveness).[4]

While Brampton’s role in pharmaceuticals and nutraceuticals has been modest, areas adjacent to the Peel Memorial Centre may be amicable to pharmaceutical manufacturing, albeit, with a smaller footprint than in past generations, or more feasibly associated with the cross-over into nutraceuticals and prevention R&D. While the City’s promotional materials for human health and sciences point toward opportunities for growth in the sector broadly, there are no concrete statistics about the pharmaceutical sector specifically.

Medical Devices

This sector represents a variety of commodity types, including composite diagnostic or laboratory reagents; medical, surgical, dental or veterinary devices and furniture; instruments and appliances; computed apparatuses; radioactive elements and isotopes; needles, catheters, etc.; mechanotherapy devices, electro-diagnostic apparatuses; and, prosthetics and artificial body parts, just to name a few.[5]

The medical device industry in Canada is broadly understood to face challenges related to scaling up.[6] Most businesses lack the capacity to take technological innovations to international markets. That is not to say, however, that there is not activity happening in the space. In fact, there is much going on; nonetheless, many companies encounter barriers to getting to the so called “next level”, and those that do break through are often acquired by larger conglomerates such as Abbott Labs, Fujifilm, Hologic Inc., Johnson & Johnson, and Siemens AG. A positive effect of this trend is that there is an indication that the sector is generating international attention.

There are numerous high-profile examples of strong medical device enterprises operating in the GTHA. Examples include:

- Novadaq Technologies Inc. (Mississauga) – a company specializing in clinical and surgical imaging systems
- Theralase Technologies Inc.(Toronto) – a company specializing in super-pulsed, cold laser technologies
- Titan Medical (Toronto) – a company specializing in precision surgical robotics such as the Amadeus Robotic Surgical System

[4] Ibid

[5] Innovation, Science and Economic Development Canada, Life Sciences Industries: Medical Devices Industry Profile, Date modified February 27, 2013: https://www.ic.gc.ca/eic/site/lsg-pdsv.nsf/eng/h_hn01736.html.

[6] Starfish Medical, “Current State of Innovation in the Canadian Medical Device Industry,” July 8, 2016: http://starfishmedical.com/2015/07/08/current-state-of-innovation-in-the-canadian-medical-device-industry/

- Medtronic (Brampton) – a company specializing largely in technologies associated in the management of heart disease and diabetes (i.e. insulin pumps)

The fact that Brampton has Medtronic as a local asset indicates that there is capacity for the area to continue to be fruitful in the space; potentially serving as an anchor to future investment attraction or entrepreneurial spin-offs in related areas. It also presents an opportunity for strengthening relations and seeking partnership or cooperative means for supporting sector investment and company expansion. This could be underpinned by a focus on driving innovation in applying technologies and implementing new model of health approaches as discussed in the report introduction.

In addition to private companies, there is also research occurring in the space which directly relates to medical device innovation. For example, Hamilton has two world class centres of excellence relating to medical devices; the Centre for Probe Development and Commercialization and the Centre for Surgical Invention and Innovation.[7] Toronto's Hospital for SickKids has a Centre for Orthotics and Medical Devices which contributes to research in the development of medical devices associated with foot, ankle, knee, hip, spine, hand and cranial conditions.[8] A further signal that the sector stands to see continued interest is a federal initiative called the MedDev Commercialization Centre, which has partners across Canada, including with MaRS Innovation, McMaster University, and the University of Waterloo.[9] Although Brampton does not have the concentration of medical device manufacturing, or the longer standing relationships in this space that some of the comparator areas in the GTHA do, Sheridan College has made significant steps forward into the supportive ecosystem. The Centre for Advanced Manufacturing and Design Technologies (CAMDT) has a focus on supporting innovation in medical device design and in 2015 entered into a partnership with 3D4MD to create and innovative 3D printed medical devices and supplies.[10]

Knowledge Capital

Growing the knowledge pool in human health and sciences is at the intersection of research and development activities and education. This dimension of the sector is plugged directly into the creative economy. A number of communities have carved out niches in the knowledge capital space. Toronto and Hamilton each have medical schools, and Toronto, Mississauga, Hamilton, and Waterloo all have universities offering at minimum undergraduate programming in biomedical sciences. The University of Waterloo even has a School of Pharmacy with a campus located in Downtown Kitchener. This has led to the

[7] Innovation, Science and Economic Development Canada, Life Sciences Industries: Medical Devices Industry Profile, Date modified February 27, 2013: https://www.ic.gc.ca/eic/site/lsg-pdsv.nsf/eng/h_hn01736.html.

[8] SickKids, Centre for Orthotics and Medical Devices: http://www.sickkids.ca/OrthoticsCentre/what-we-do/index.html.

[9] MedDev Commercialization Centre: http://www.meddevcentre.ca/.

[10] https://www.sheridancollege.ca/news-and-events/news/3d4md-and-sheridan-college-announce-exciting-new-partnership.aspx

informal creation of a human health and sciences innovation corridor along the 401 and within the Greater Toronto and Hamilton Area.

Research Centres represent a means of bringing together global experts to assess and solve puzzles. Hamilton's McMaster University recently joined Germany's Fraunhofer Institute for Cell Therapy and Immunology in creating a new research centre in Hamilton's innovation park.[11] Meanwhile in Toronto, it was the Sunny Brook Health Sciences Centre that pioneered a new scalpel-free medical procedure to tread uncontrollable hand tremors.[12]

Other examples of increasing knowledge capital include the recent JLABS creation of the Toronto MaRS Discovery District's life science incubator which has been generally receiving positive media attention, with the exception of budget over-run reports that emerged during its expansion.[13] Stakeholder interviews indicate that MaRS is so popular that it is nearing capacity and alternate space may soon be required. This may present an opportunity for cities like Brampton to serve as a secondary location, or provide much needed second stage space for companies that have evolved out of start-up and incubation environments. The PMC development and its focus on integrated health could be leveraged as a means of heightening the appeal of Brampton as a community moving with the current of change on health sciences. Ensuring that the necessary flex medical and office space is available in proximity to the site, as well as increasing local area revitalization efforts and improved commercial and lifestyle amenities could work to stimulate increased investment interest.

The knowledge economy in human health and sciences also has important connections to engineering programs, where breakthroughs are occurring in areas of medical devices and health related information and communications technology (ICT). Addressed in further detail below, the connection between institutions of learning and innovation clusters in health-related technology is undeniable for strongholds such as Waterloo and Toronto.

Hospitals and care facilities are also key components of the knowledge capital in human health and sciences; particularly institutions that are affiliated with medical schools. The large concentration of hospitals, including for mental health and addiction resources, has cemented Toronto as a key player in the human health and sciences knowledge economy. Relatedly, organizations such as the Toronto Health Economics and Technology Assessment (THETA) Collaborative bring together

[11] Williams, Patricia. 2016. "State-of-the-art research centre slated for Hamilton," Daily Commercial News, August 30: http://dailycommercialnews.com/Projects/News/2016/8/State-of-the-art-research-centre-slated-for-Hamilton-1018143W/

[12] Roussey, Kas. 2016. "No scalpel, no drill: Medical procedure to treat uncontrollable hand tremor a 'game changer,'" CBC News, August 24: http://www.cbc.ca/news/health/essential-tremor-health-surgery-clinical-trial-brain-disease-1.3732875

[13] Dawes, Terry. 2016. "JLABS Opens Toronto MaRS Discovery District Life Sciences Incubator," cantech Letter, May 12th: http://www.cantechletter.com/2016/05/jlabs-opens-toronto-mars-discovery-district-life-sciences-incubator/

critical, peer and inter-disciplinary feedback, discussion, and reflection on human health and sciences related technologies, approaches, advancements and trends. Some areas of recent research include:[14]

- End-of-life care interventions and economics
- Blood supply and infectious disease
- Cost analysis and scientific study
- Interdisciplinary treatments

These spaces create an environment for the fruitful exchange of ideas. A common denominator of the municipalities that have strong research and innovation occurring in human health and sciences, particularly in technology, is that they all have universities in their communities in addition to colleges. These spaces make for fertile grounds in the nexus between entrepreneurialism and health. Brampton does not have a university campus or satellite campus, but does have a Sheridan College satellite campus, where there is a community pharmacy assistant program available.[15] This, though modest in comparison to a medical school or biomedical program, illustrates the potential for additional growth in pharmaceuticals knowledge development or other areas of life science. The CAMDT mentioned in the section above highlights the existing knowledge and applied research assets that already exist in the city through post-secondary networks. These should be explored in further depth to identify how they can be potentially broadened to include universities, other research organizations, and the private sector in order to stimulate increased intellectual property development and design creation in Brampton. Encouraging the necessary type of learning, exploration, and innovation space for this to occur in connection with a hospital partner that is focused on integrated health and implementing new models of health and service delivery could provide the area with a distinct competitive advantage.

Health ICT and Big Data

Innovation is occurring all the time in the human health and sciences sector. An area of critical convergence has been the connection between information and communication technologies and human health and sciences. The growing importance of ICT and big data for the human health and sciences sector, both as a means of monitoring and treating illness and of growing business opportunities, is one of the fastest growing segments of the sector. Technology hubs centered on top quality engineering faculties such as the University of Waterloo and University of Toronto continue to draw investment attention to the broader region; however there is even more occurring beneath the surface. Recent media attention centring more broadly on

[14] Toronto Health Economics and Technology Assessment Collaborative. Completed Studies. Accessed September 9, 2016: http://theta.utoronto.ca/Completed_Studies

[15] Ontario Colleges. 2016. Pharmaceutical Programs at Ontario Colleges: http://www.ontariocolleges.ca/SearchResults/HEALTH-FOOD-MEDICAL-PHARMACEUTICAL/_/N-lqhn

the Waterloo-Toronto technology corridor has earned the region the title 'Silicon Valley North.' This has increased the focus on the area as a place for investment in technology development, and particularly in software.[16]

The development of mobile apps represents a cost-effective and potentially lucrative market for entrepreneurs in the human health and sciences sector. The mobile app ParticipAid was developed by graduates of McMaster University, allowing researchers to connect with potential participants through the interface.[17] Akira, a mobile platform based on Toronto, launched in spring of 2016; offering patients opportunities to access a board certified physician remotely for health consultation information.[18]

Meanwhile much is also being done to create apps designed to reduce hospital stay length times, such as Mohawk College's new Technology Access Centre for Digital health, which will be working with businesses to create new health technology to get patients home from hospitals sooner with the use of smartphones.[19] Here is an example of the interplay between a learning institution and the private sector to solve identified challenges.

Big data is also an area gaining critical interest in both academic and private sector settings. A recent Globe and Mail expose on the subject identified health-care improvements as one of the key areas where big-data advancements and analytics could save money and lives.[20] The big data industry in human health and sciences also has spin off potential for other sectors not traditionally affiliated with health care, such as graphic or other media design (for conveying information visually).

Research undertaken at McMaster University acknowledged the utility of big data in helping to plan for medical needs in hospitals as the Baby Boomer generation ages and hospital resources are constrained.[21]Data collection, storage and analysis will be important components of the industry as the demand for health related data grows. With these expectations is the demand for specific skills sets and physical space to house such facilities.

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[16] Fraser, Laura. 2016. "Silicon Valley North? Toronto-Waterloo position themselves as next tech hub," CBC News, April 4: http://www.cbc.ca/news/canada/kitchener-waterloo/silicon-valley-toronto-waterloo-1.3519032

[17] Xian Kon, Wan. 2016. "Bridging the gap with a mobile app: ParicipAid aims to connect researchers with potential volunteers," The Varsity, August 12: http://thevarsity.ca/2016/08/12/bridging-the-gap-with-a-mobile-app-2/.

[18] Dawes, Terry. 2016. "Doctor-on-demand app Akira Launches in Ontario," cantech letter, ay 19: http://www.cantechletter.com/2016/05/doctor-demand-app-akira-launches-ontario/

[19] Frketich, Joanna. 2016. "Mohawk College to be a major driver of health technology," Hamilton Spectator, Septemeber 7, 2016: http://www.thespec.com/news-story/6845578-mohawk-college-to-be-a-major-driver-of-health-technology/

[20] Davila, diamond and Szigeti. 2016. "There's no Big Data without intelligent interface," The Globe and Mail, Aug 22: http://www.theglobeandmail.com/report-on-business/rob-commentary/theres-no-big-data-without-intelligent-interface/article31482335/

[21] Paddon, Natalie. 2015. "'Big Data In Action' can help health care: Mac researcher," Hamilton Spectator, November 5: http://www.thespec.com/news-story/6077841--big-data-in-action-can-help-health-care-mac-researcher/

2.3.1 Summary of Ecosystem Findings

Brampton's place within the ecosystem is beginning to show signs of further potential, although it remains uncertain and will require continued planning, long term thinking, and support. Key observations emerge from an assessment of its construction and composition:

- Post-secondary institutions are anchors for connecting research with market needs in human health and sciences
- Connections to centres of research enhance exposure and deepen international networks
- Media attention can help propel a local brand or niche area of expertise (consider for example the frequency of reporting on Hamilton's human health and sciences sector)
- Medical device enterprises are a focal point for international attention for acquisitions, and the space is active with strengths in both private sector entrepreneurialism and academic research and development
- Innovation spaces designed for start-ups are filling and there may be a need for additional space for companies looking to expand outside of MaRS but, remain within the GTA and in proximity to the Discovery District
- Toronto is consistently viewed as a hub for human health and sciences in areas of pharmaceuticals, ICT, and knowledge capital, with Hamilton and Waterloo also being strong clusters

2.4 Stakeholder Discussions

Interviews were conducted with 30 experts and stakeholders in the human health and sciences sector from across the GTHA. The purpose was to gain an understanding of new directions emerging in human health and sciences, the potential for cluster growth in Brampton, and ways in which the PMC and future developments on its campus may help to contribute to human health and sciences for health and wellbeing.

This section provides an overview of key themes from the stakeholder discussions. Analysis that is more detailed is available in the technical appendices under section **Error! Reference source not found.**. The key themes are as follows:

- **New Holistic Model of Human Health and Sciences**: the idea that preventative products, technologies, and practices can provide a proactive means of addressing public health challenges, and provide a new and expanding market for private enterprises and entrepreneurs. The holistic approach builds on the historical tenancy to focus on treatment of illness, rather than prevention, thereby expanding the range of opportunities for new growth
- **Local Anchors**: the idea that the PMC and a few flagship companies, such as Medtronic, can function as a focal point for additional interest in development and investment

- **Partners, Champions, and Roles**: the idea that a winning team constitutes a combination of key players, each of whom is cognizant of their respective abilities and roles
- **Export-Oriented Markets**: The idea that the cluster represents an opportunity for upscaling and growth of not only technology, medicine and devices, but also knowledge, skill and expertise, which can be exported beyond Brampton's municipal boundaries
- **Post-Secondary Campus Facilities**: the idea that despite it likely being unrealistic to start a new college or university centred on human health and sciences-related educations, there are good opportunities to formulate partnerships with existing universities and colleges such as McMaster and University of Toronto or Sheridan College
- **Innovation Space**: The idea that the cluster can serve as space for innovation, entrepreneurialism, and investment attraction and expand the parameters of the traditional model of health by integrating new modes of health and wellness. The concept of developing a centre of excellence around the application of technology and implementing new models of health in actual care and delivery environments
- **Infrastructure Requirements**: the idea that having the right transit infrastructure, municipal layout and access will enhance the ability of the cluster to thrive in the area surrounding the PMC and also facilitate attraction of post-secondary collaborative opportunities
- **Perceptions to Overcome**: the idea that Brampton suffers from a challenge of perception along multiple fronts: first, as a waning manufacturing location, second as a bedroom community for commuters, and third as a place lacking in quality of life activities, amenities and attributes

2.5 Focus Group Workshop

A focus group workshop was conducted with business and industry stakeholders from the human health and sciences sector. Key themes emerging from focus group discussions include:

Making Development Easy: Ensuring land-use zoning is anticipatory of development needs rather than reactive (e.g. initiating pre-zoning plans), creating incentive programs to reward early investors via tax breaks or other lowered development costs, and streamlining of application and approval processes

Place-making: Greening the area, developing and enhancing parks at a broader scale than the core district, and ensuring attractive amenities and a range of living options are available to different income levels are thought to encourage talent attraction and retention. Closely related are ideas associated with transit and active transportation infrastructure and accessibility

PMC as a Hub: Fostering linkages between the PMC, post-secondary institutions, and R&D firms to grow interconnections and develop new areas of specialization, and creating spaces for formal and informal meeting and interaction to enhance the exchange and sharing of ideas

Competitive Positioning: Positioning the area as competitively located for a variety of transport and its proximity to Toronto and Waterloo, emphasizing various medical sites that include state of the art medical facilities and dedicated training programs, leveraging specific strengths in diabetes treatment and prevention, and marketing the diversity of the population to support ethnic and cultural research

Transit and Infrastructure: Making the PMC accessible directly by GO Train (with all day service both directions), ensuring PMC becomes a critical node for public transit, and developing active transportation infrastructure that is encouraging of cycling with storage and locking facilities for bicycles, and which enhances walkability of the entire district

3 Grounding the Evidence

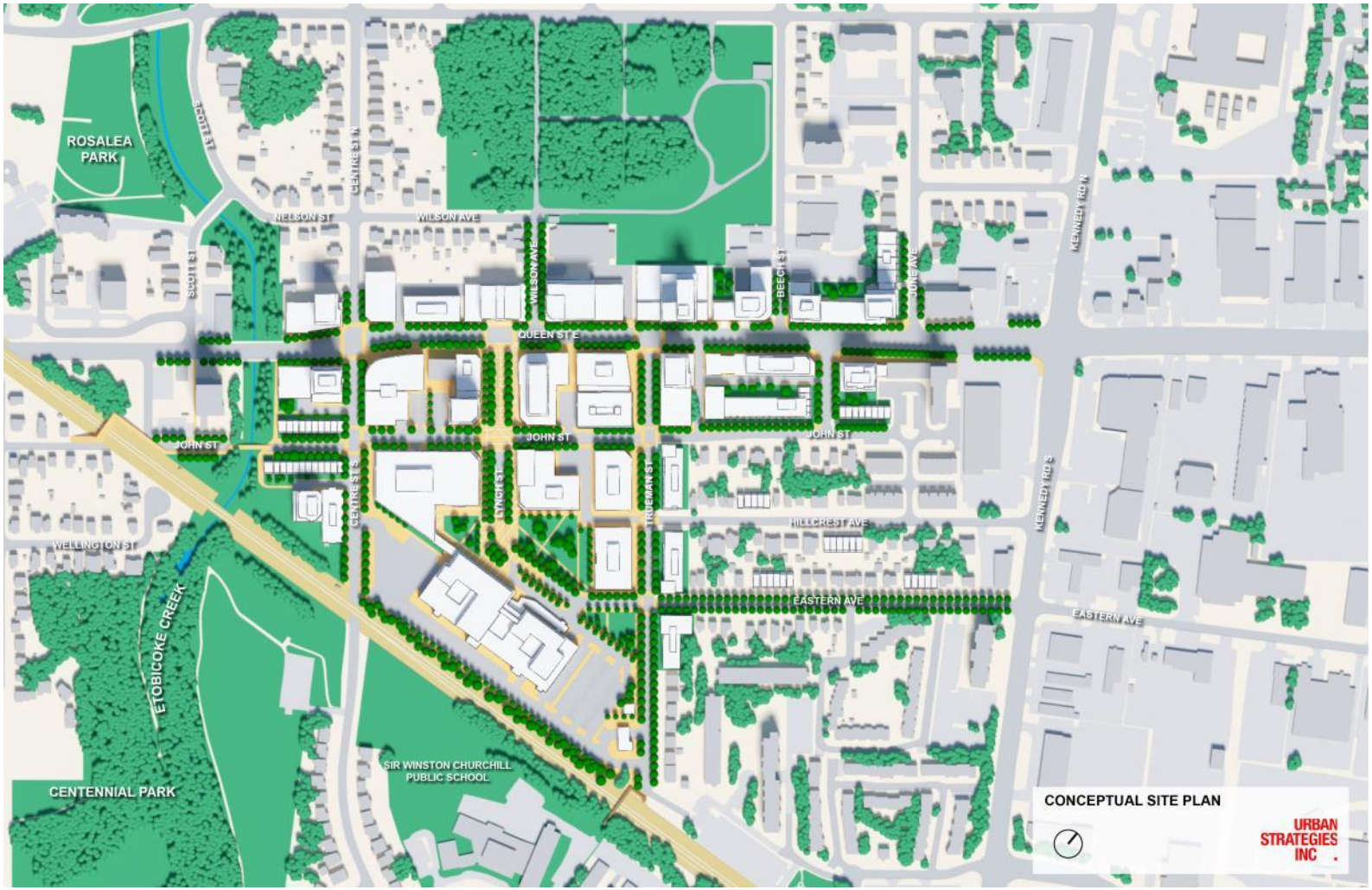
An important aspect of this project has been to assist the City of Brampton in identifying how it can differentiate itself in the human health and sciences landscape that stretches across the Greater Toronto and Hamilton Area (GTHA) including the Region of Waterloo that makes the Toronto to Waterloo Technology Corridor. Further, it has been to provide the underpinning concepts for establishing an economic vision for the City that it can pursue, in collaboration with the private sector, to foster the creation of a sustainable human health and sciences cluster. Drawing on the collective research and findings discussed in the report above (and uncovered through the primary and secondary research undertaken to shape these understandings), the following section begins to tie the knot between what could be possible and what can be done. In particular, this project has been tasked with identifying how the Peel Memorial Centre for Integrated Health and Wellness (PMC) development can be leveraged to stimulate more interest and development growth to support health and human health and sciences cluster development in Brampton.

This project is focused on this question, and providing a theoretical development scenario of what would make most sense from a built form perspective over the next five to 20-year period. Six conceptual drawings have been prepared and provided below that provide a visual representation of what could be developed in the study area in close proximity to the PMC development lands. This begins with the development phases of the PMC site itself, phase one nearing completion early to mid-2017, phase two being understood as hospital expansion space (as yet undetermined), and phase three representing roughly four acres of "partnership opportunity" space. As a part of the project process, the following concepts were vetted through the City of Brampton staff and Steering Committee to ensure that the direction the consulting team is taking with respect to what is potentially feasible for development in the area related to supporting a health and human health and sciences cluster is achievable. These conceptual drawings are as follows:

- Conceptual Site Plan
- Development Yields
- Mobility Network
- Building Heights
- Draft Concept 3D Visuals (two images)

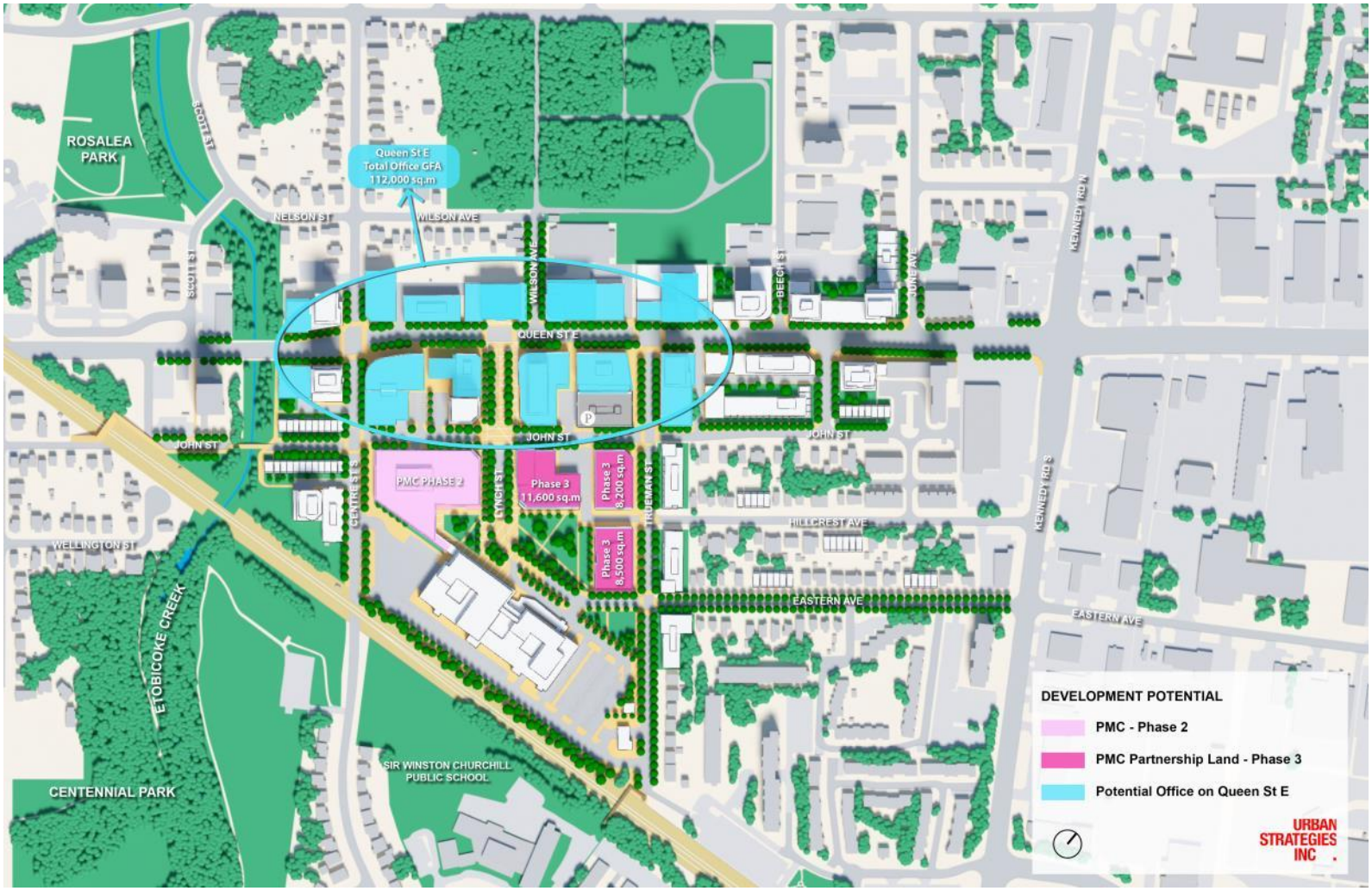
The drawings take into consideration the existing development currently in the site planning process, and the desire on the part of the City and stakeholders to see the area increase its beautification and walkability. Alternative transportation modes have also been incorporated and the recognition for the need for mixed use commercial/residential and an increased level of flex office, flex-medical and contemporary office space along the Queen Street Corridor and surrounding the PMC site.

FIGURE 5: CONCEPTUAL SITE PLAN - BRAMPTON HEALTH AND TECHNOLOGY CAMPUS



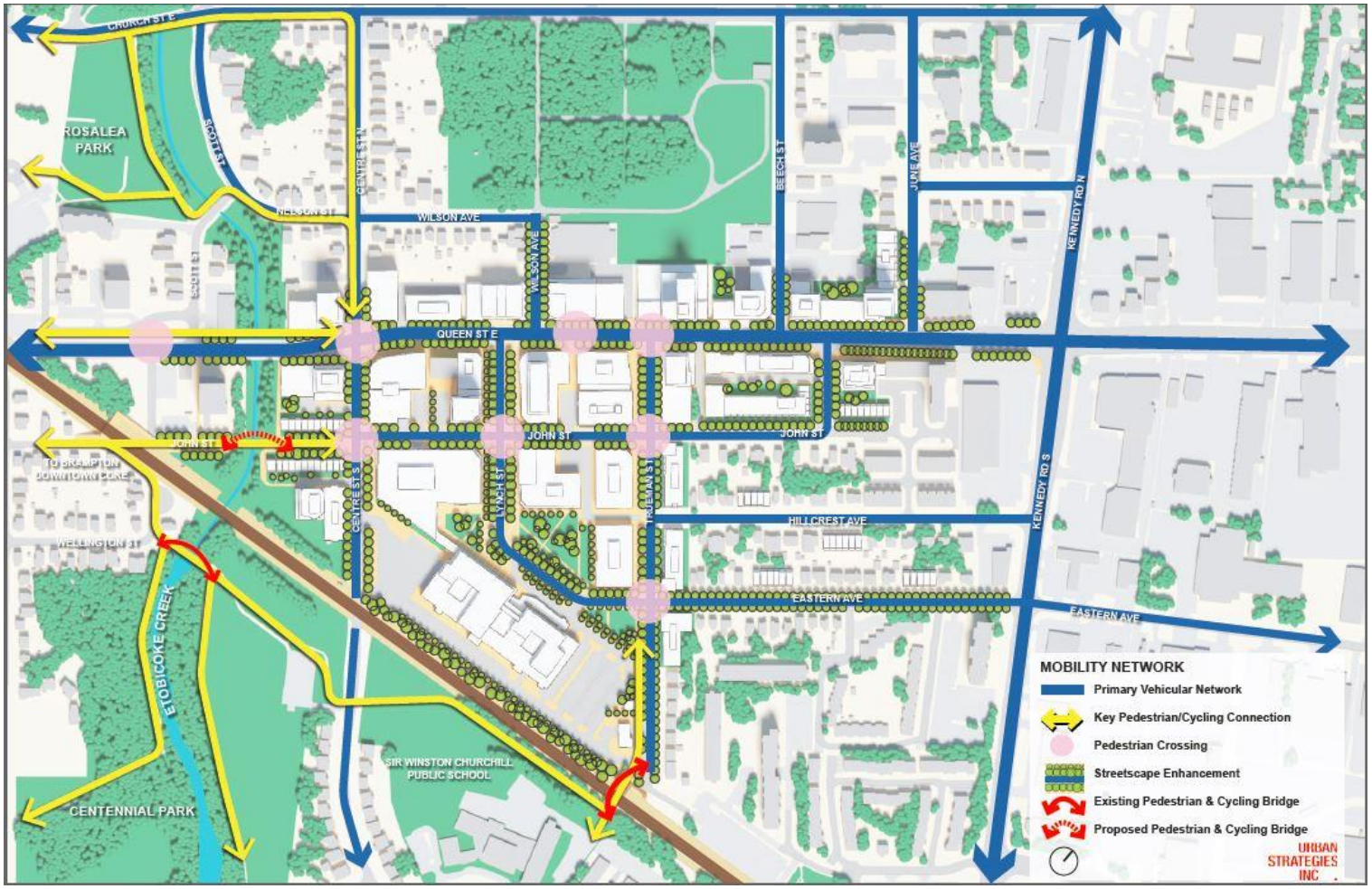
Source: Urban Strategies Inc.

FIGURE 6: DEVELOPMENT POTENTIAL - BRAMPTON HEALTH AND TECHNOLOGY CAMPUS



Source: Urban Strategies Inc.

FIGURE 7: MOBILITY NETWORK - BRAMPTON HEALTH AND TECHNOLOGY CAMPUS



Source: Urban Strategies Inc.

FIGURE 8: BUILDING HIEGHTS - BRAMPTON HEALTH AND TECHNOLOGY CAMPUS

Source: Urban Strategies Inc.

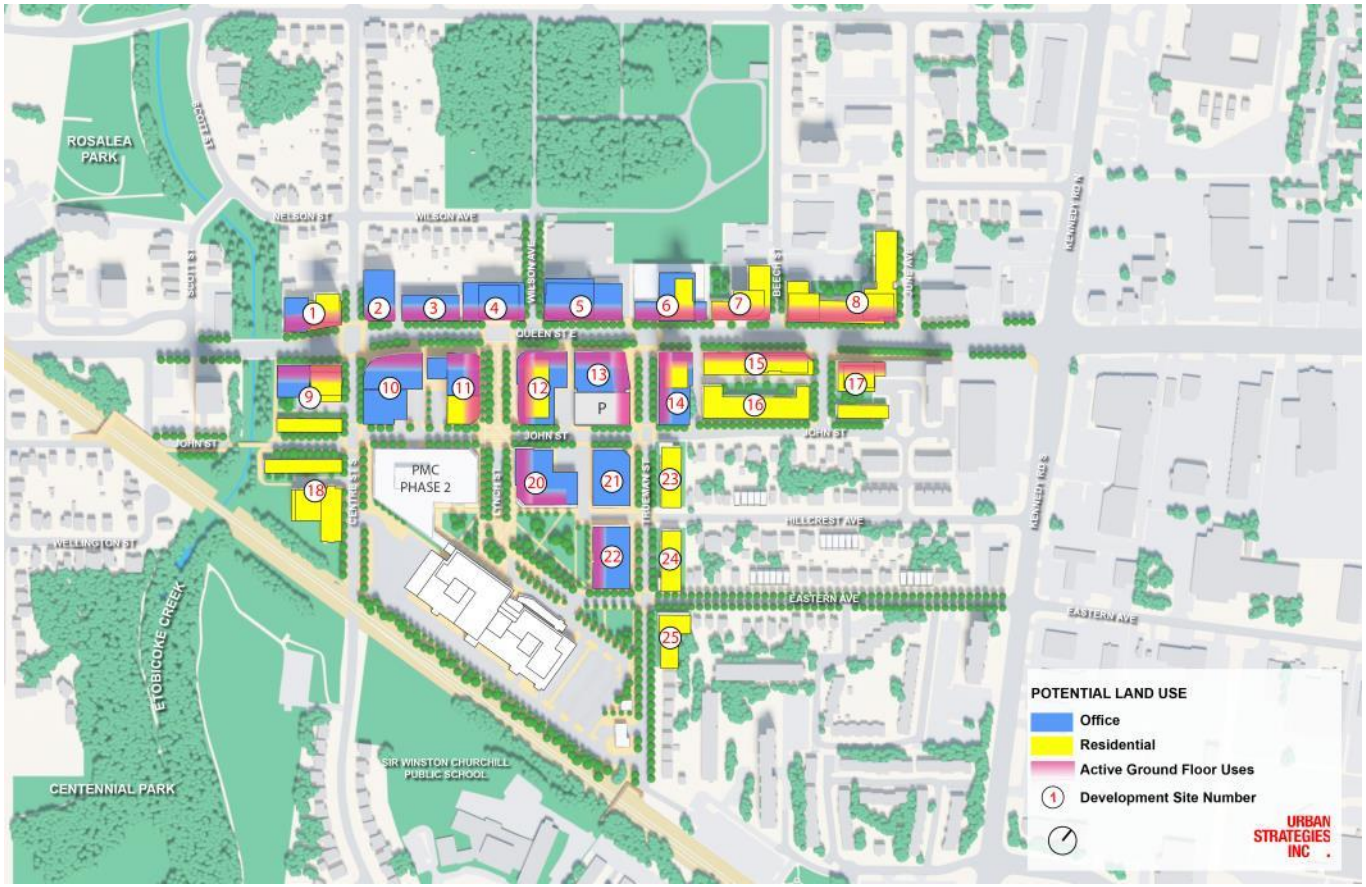
FIGURE 9: CONCEPT 3D VISUAL - BRAMPTON HEALTH AND TECHNOLOGY CAMPUS.

Source: Urban Strategies Inc.

3.1 Brampton Health and Technology Campus Yield Analysis

As noted above, the project proposes development in the immediate area of the PMC's Phase 1 component. Based on these considerations projections for the expected yields have been developed for 25 project sites that include developments associated with Phases 2 and 3 of the PMC in relation to a Health and Technology Campus.

FIGURE 10: CONCEPTUAL SITE PLAN OF 25 DEVELOPMENT PROJECTS FOR THE BRAMPTON HEALTH AND TECHNOLOGY CAMPUS



Source: Urban Strategies Inc.

As shown in Figure 11, total gross floor area of all the projects is 383,650 square meters, of which nearly 60% would constitute residential space, with the remainder being office and retail space.

FIGURE 11: YIELD ANALYSIS SUMMARY - BRAMPTON HEALTH AND TECHNOLOGY CAMPUS

	Approx. Total GFA	Approx. Total Residential GFA	Total Number of Residential Units	Approx. Total Office GFA
Total (Sq.m)	383,650	219,060	2,191	136,875
Total (Sq.ft)	4,130,000	2,360,000	2,191	1,475,000

Source: Urban Strategies Inc. GFA = gross floor area.

3.2 Municipal Servicing Review

A review was conducted of several key documents concerning the adequacy of the existing water, wastewater, and stormwater services to support the proposed PMC development. The four documents assessed were:

- City of Brampton Central Area Sustainable Infrastructure Study – Baseline Review Report (WSP Canada Inc., 2014)
- Queen Street Class Environmental Assessment, Centre Street to Highway 410 (iTRANS Consulting Inc., 2008)
- Queen Street Class Environmental Assessment, Centre Street to Highway 410 – Drainage and Stormwater Management Report (GENIVAR Ontario Inc., 2008)
- Region of Peel 2013 Water and Wastewater Master Plan for the Lake-Based Systems, Volume III – Water Master Plan (AECOM and BluePlan Engineering Consultants Ltd., 2014)

The following aspects of municipal infrastructure were assessed based on their current and expected capacity by 2031 (based on population projections as obtained from Urban Strategies). Key observations include:

- **Water Servicing**: Currently as well as by 2031 the PMC study area will have two nodes that do not meet fire requirements; however, dead-end streets often reflect inadequate flows and upgrades may not be required.
- **Wastewater Servicing**: The sanitary sewer system within the PMC study area has adequate capacity. Under 2031 conditions, most of the sanitary sewers demonstrate a loading ratio between 0 – 0.8, indicating no surcharge, and a depth

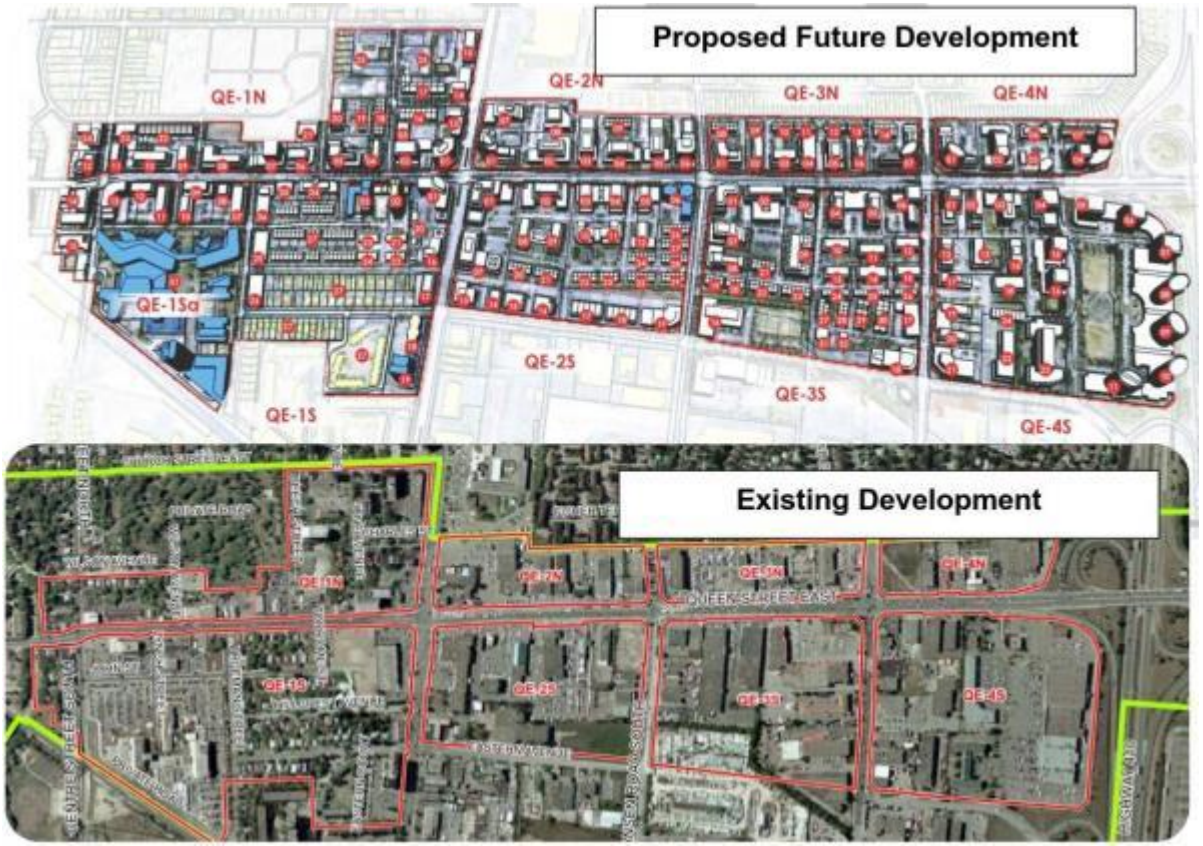
to water level greater than 1.8m. At the dead-end of the Lynch Street, Centre Street, and John Street sewers, a depth to water level of 0 – 1.8m is observed. These conditions indicate that the sanitary sewers within the PMC have adequate capacity to service the projected developments.

- **Stormwater Servicing**: A sample area, QE-1S (Figure 12), which includes most of the PMC study area, was analyzed to evaluate the impact of development on the stormwater system. The reports indicated that the storm sewer on Queen Street between the Etobicoke Creek Tributary and June Avenue did not have adequate capacity for the 5 and 10-year storm events under the proposed road widening conditions. Nonetheless, the development of the PMC study area is still expected to conform to City of Brampton's stormwater management criteria, including stormwater quantity and quality control because new stormwater management plans will provide on-site stormwater storage and water quality treatment facilities. Therefore, they will improve the existing conditions. Further studies are suggested to investigate the existing storm drainage conditions, which are not assessed in the documents reviewed.

Conclusions

Based on the review of the previous study reports and proposed future development within PMC study area, existing watermains and sanitary sewers are understood to be adequate to support the proposed development within the PMC study area.

FIGURE 12: AREAS QE-1S, QE-2S, AND QE-4S FROM THE QUEEN STREET CORRIDOR.



Source: WSP Canada Inc. City of Brampton Central Area Sustainable Infrastructure Study – Baseline Review Report, 2014.

When the City's stormwater management criteria are implemented within the PMC study area, the on-site stormwater quantity control and quality control measures will improve the existing storm drainage conditions, rather than contribute to strain.

It must be noted that these conclusions are based solely on the documents assessed, and further detailed studies are recommended to determine the adequacy of existing municipal services within the PMC study area pending decisions to advance projects.

3.3 Transit and Transportation Infrastructure Considerations

The Peel Memorial Centre (PMC) and its health and technology campus are an evolving a focal point of health services and research, with the potential to serve to encourage business attraction as well as spur development in the central area for the City of Brampton. From a transportation perspective, the PMC is uniquely integrated into the Downtown serving both the hospital uses as well as the broader community. As the PMC population and the broader community develop, the central area will need to continue to evolve to meet the needs of this changing population.

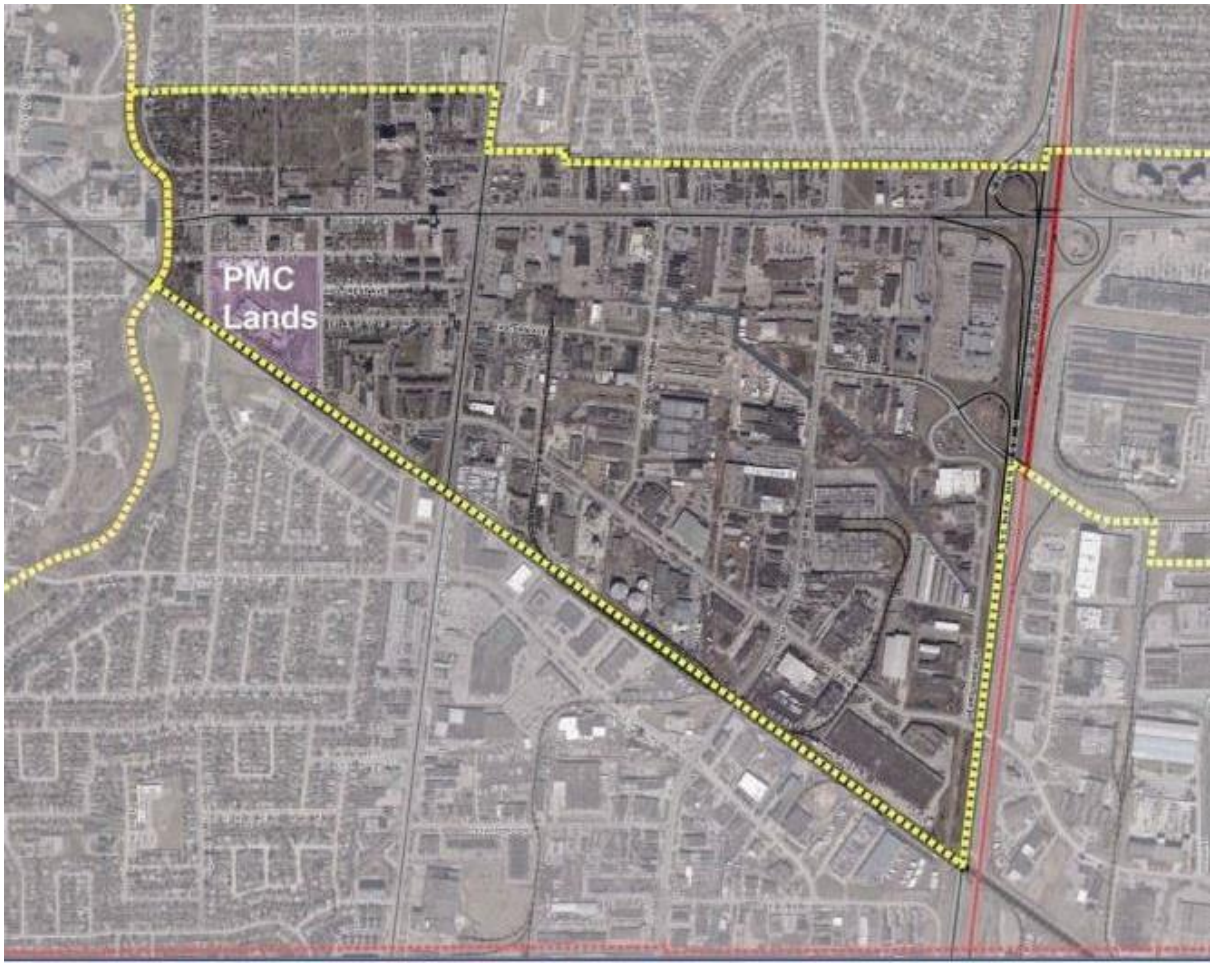
As part of this evolution, the City of Brampton has undertook a precinct review for the area surrounding the PMC to identify how the City can make strategic investments in order to capitalize on the hospital's development. This review aims to identify key opportunities to position the area such that it can adapt to its continually changing population and institutional needs, as well as help it respond the surrounding urban fabric. The purpose of this transportation study is to support these changes introduced by the economic development and planning policy review, as well as to identify opportunities to improve the area's public realm and transportation network.

This study has evaluated the existing transportation conditions on in the Downtown central area. With few exceptions, the study finds that the existing transportation infrastructure meets the needs of the PMC today, but in order to realize the full potential of the area would require some key improvements are required. Specifically, the study looks to increase the number of alternative routes available within the area in an effort to relieve existing pressures while providing flexibility to accommodate an increasing non-auto use.

3.3.1 Study Framework

This study evaluates the existing transportation conditions within the PMC precinct of the Downtown Brampton central area while also investigating future transportation conditions. Subsequently, implementation recommendations for the City will be provided based on these evaluations. The study area is bounded by Highway 410 to the east, Etobicoke Creek to the west, Church Street and Archdekin Drive to the north, and the rail corridor to the south. The study area boundary is displayed in Figure 13Error! Reference s ource not found..

FIGURE 13: STUDY AREA FOR TRANSPORTATION STUDY



This study proceeds by presenting the situation of the PMC precinct with respect to the transportation network of the City. This shows the relationship between the City's transportation network and the precinct. The study then reviews data from the Transportation Tomorrow Survey (TTS), cordon count results, and vehicular travel information. This data shows the precinct's present transportation conditions, as well as impacts on the immediate and greater road networks of the City. After determining the precinct's existing transportation network, the projected future demand of the precinct is determined, along with opportunities to enhance the public realm and transportation network, particularly in regard to pedestrian

and cyclist movement. Finally, the study highlights key findings and discusses implementation recommendations for the City moving forward.

3.3.2 Key Elements of the Study

Active Transportation

Currently the precinct does not provide a network of dedicated cycling facilities either on-road or off-road. Sidewalks are provided on almost all existing roads with the exception of Eastern Avenue between Kennedy Road and Hansen Road. East of Kennedy Road, where the land use is primarily industrial, the road network, and subsequent pedestrian network, is sparse make walking and cycling a challenge to be a viable mode of travel for people coming to/from the PMC precinct via this area.

Transit Network

The proposed development is serviced primarily by conventional Brampton Transit, the Brampton Züm Bus Rapid Transit service, and the GO bus. The Brampton Bus Rapid Transit Service, branded Züm, provides limited stop routes with transit signal priority and off vehicle fare purchase. Key attributes of these different transit modes relative to the PMC precinct include:

- Brampton Züm 501/501A: The Züm route 501 provides service along the Queen Street East corridor. This route operates between the Downtown Terminal and York University in Toronto. The nearest station to the subject site is located at the Queen Street East & Centre Street intersection.
- Route 1/1A: Route 1 is a primary corridor route which travels along Queen Street East from Highway 50 to Mount Pleasant GO Station. Route 1A provides peak and midday service from Monday to Friday between Chinguacousy Rd. and Delta Park Blvd.
- Route 7/7A: Route 7 operates between Mayfield Road and Courtney Park Drive. Route 7A operates between Heart Lake Terminal and Courtney Park Drive weekday peak periods only.
- Route 8: Route 8 operates along Centre Street between the Brampton Gateway Terminal and Bramalea Transit Terminal, In November 2016, this route was realigned to service the PMC with a loop via John Street/Lynch Street Extension/Trueman Street.
- Route 52/52A: Effective March 6, 2017, Route 52/52A will be extended from the Downtown Terminal to the PMH site via Queen Street to Lynch Street. This route operates to County Court Blvd via Gateway Terminal and Sheridan College. The Route 52/52A extension will provide a direct connection between the PMC site and the Downtown Terminal (shared with GO bus), and the Brampton GO Train/VIA Rail Station.

Road Network

The PMC precinct is located in an urban area but due to it being bounded by the rail corridor to the south and Highway 410 to the east it exhibits a limited road network. Key roads in the PMC precinct include:

- Kennedy Road South
- Clark Boulevard
- Rutherford Road South
- Eastern Avenue
- Orenda Road
- Centre Street South
- John Street

The travel mode choice determines which elements of the City's transportation networks will be affected by a trip. The majority of trips in Brampton are made by car, either as driver or passenger (89.5%). That said, the trends have indicated the number of trips made by transit, both local transit and GO Transit, have increased. The majority of trips can be seen to originate either within Brampton or Peel Region, highlighting an opportunity for the increased transit use.

Transportation Flows

Traffic flow in the precinct is constrained by the number entry and exit points. Specifically, bounded by the rail corridor to the south traffic is focused through a limited number routes, which concentrates traffic to a point where the traffic demand along Kennedy Road was identified to exceed the theoretical capacity of that road. A likewise situation was identified along the easterly boundary along Queen Street at the Highway 410. However, at the same time due to the discontinuous road network it was identified that there was an underutilization of Clark Boulevard. Bringing these results forward, the traffic constraints signal further opportunities to develop infrastructure that is more accommodating to public transit and active transportation.

Active Transit Infrastructure

A number of different road configurations are available that in the future would enhance and encourage active transportation within as well as to and from the PMC precinct area. By making these changes it is expected that residents within the area and commuters to it will have greater incentive to avoid using single occupancy vehicles, instead opting for easy to access and safe alternate routes.

There are a number of different forms of streets that more strongly support and facilitate pedestrian and cyclist movement than a typical local road. Most streets on precinct, while providing basic connectivity, can be further improved through the application of the following typology (further descriptions and examples of each are provided in the Technical Appendix):

- Two-way street with enhanced design (i.e. designated bike areas, raised curb sidewalks, etc)
- One-way street (same as above, but on a one way street)
- Shared street (Woonerf) (designed with extra breadth, usually on alternatively textured surfaces to help distinguish vehicular and other uses)
- Closed street (pedestrians and cyclists only)

The order of the listed streets follows a progression from lesser to greater focus on facilitating pedestrian and cyclist movement. Depending on the characteristics exhibited by the candidate streets, the City of Brampton could consider modifying the candidate streets, or portions thereof, to the appropriate form.

3.3.3 Conclusions

Recommendations have emerged and are presented in the appropriate section below to address all users of the precinct and the City's transportation network. A series of improvements to the Peel Memorial Centre precinct public realm are the primary recommendations emerging from this study. These public realm improvements are recommended for the road network in the western portion of precinct, particularly along Lynch Street and Trueman Street, to more equitably and reflectively facilitate the movement of pedestrians and cyclists. With the PMC hospital active, ensuring that the connections are developed between Queen Street and the PMC is critical and should be a priority for the City.

Additionally, this study has identified that the extension of Eastern Avenue from Hansen Road to Rutherford Road will have the potential to provide both benefits from a vehicular and transit perspective and should be promoted within the City's works program, and the Environmental Assessment study initiated as well as capital funding allocated for its construction.

In summation, in terms of establishing a transportation planning vision for the PMC precinct, it is envisioned that through the subsequent recommendations the area will become highly accessible by modes of travel other than auto, with an inviting and enjoyable public realm that rewards residents and employees for choosing to take transit, walk, or cycle to the precinct.

3.4 Brampton Health and Technology Campus Economic Impacts

The conceptual plans for a health and technology campus outlined above constitute a range of projects envisioned for development over the coming 25 years. In total, 25 projects are envisioned for the campus, which form the basis for the economic impact analysis conducted below.

3.4.1 Economic Impact Estimates: Key Assumptions

The following assumptions lie behind the economic impact estimates:

- Construction on project 1 will begin in 2017
- Project 2 will begin in 2019
- Projects 3 and 4 will begin in 2020
- Project 5 will begin in 2021
- Project 6 will begin in 2022
- Projects 7 and 8 will begin in 2023
- Projects 9 and 10 will begin in 2024
- Project 11 will begin in 2025
- Projects 12 and 13 will begin in 2026
- Projects 14 through 20 will begin in 2027
- Projects 21 will begin in 2028
- Projects 22 and 23 will begin in 2029
- Projects 24 and 25 will begin in 2030
- Full occupancy of all space of each project will occur in the year after construction is completed

This construction and occupancy phasing has been assumed for illustrative purposes only. Not all projects will take the same length of time, nor will they necessarily occur in the order and frequencies outlined here. Instead they are used to project the economic impact of the hypothetical schedule outlined above.

Construction Costs

Construction costs are based on the Altus Group Construction Cost Guide 2015 for the GTA:

- Construction cost for office space is assumed at $200 per square foot
- Construction cost for retail space is assumed at $175 per square foot
- Construction cost for condominium space is assumed at $300 per square foot

3.4.2 Economic Impacts of Construction Activity

The economic impacts – direct, indirect and induced – were estimated based on Statistics Canada's 2010 (latest available) economic impact multipliers for construction activity. Economic impacts for each project were derived according to the above described construction schedule.

The estimated construction costs of each project are translated into the project's impact on GDP (that is, the contribution of each project to overall value added) and its impact on jobs (on a full time – full year basis):

- The direct impacts reflect the impact of the construction project itself (that is, the wages paid, materials used and profits earned from the project)
- The indirect impacts reflect the impacts on feeder industries to the construction activity (for example, construction activity uses the output of steel and cement producers in building a project)
- The imputed impacts reflect the impact on household spending that arises from the wages earned by those employed on the construction project itself and from the wages earned by those supplying materials to the project

Note that all direct impacts occur within the area of the projects themselves but the indirect and induced impacts can occur outside of the project area or municipality in other communities, other provinces or even other countries

3.4.3 Economic Impacts of Office and Retail Activities

The revenues generated by all of the office and retail businesses occupying each project once completed were generated based on estimates derived by metro economics from a variety of sources regarding space required per job, revenues per worker, etc.

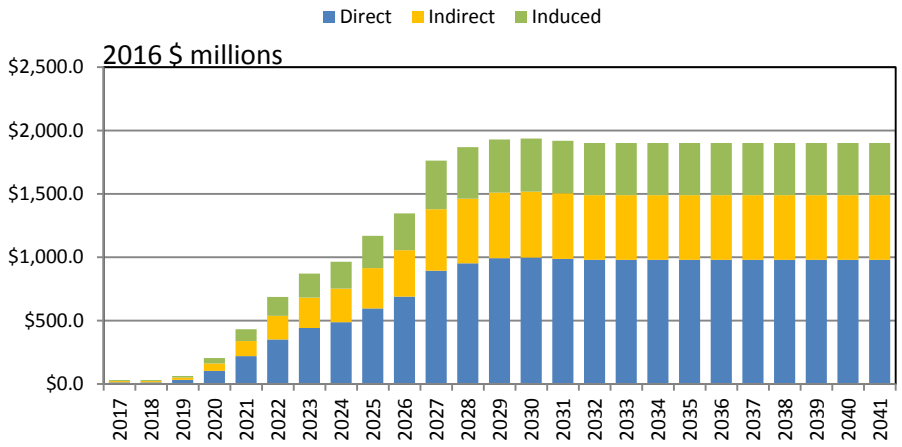
These direct economic impacts were translated into indirect and induced estimates and GDP and job impacts using Statistics Canada's 2010 economic impact multipliers for the Ontario's multipliers for the industries that typically occupy such space. For office activities it was assumed that office means a combination of office and other commercial activities. Thus a weighted set of multipliers were developed considering the individual multipliers for each of the following industries:

- Information, cultural industries
- Finance, insurance, real estate
- Professional, scientific, technical
- Other business services
- Arts, entertainment, recreation
- Accommodation, food
- Public administration

For retail activities the multipliers for the retail industry alone were used.

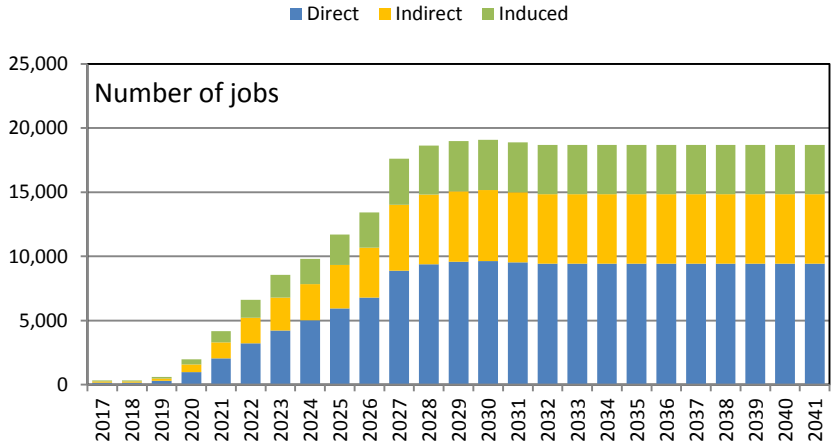
Figure 14 and below summarize the real GDP and job impacts – direct, indirect and induced – across the time period from 2017 to 2041.

FIGURE 14: IMPACT OF 25 BHTC PROJECTS ON REAL GDP (MILLIONS OF CONSTANT 2016 DOLLARS)



Source: metro economics

FIGURE 15: IMPACT OF 25 BHTC PROJECTS ON JOBS (FULL TIME – FULL YEAR EQUIVALENTS)



Source: metro economics

In addition to jobs and GDP projections, additional analysis was conducted in terms of the impact on development charges, building permit fees, and property taxes. Rates used in the projects were based on City budget data for 2016 and in constant 2016 dollars.

FIGURE 16: IMPACT ON MUNICIPAL CHARGES AND LEVIES ($ MILLIONS)

All values in millions of constant 2016 dollars	Construction Phase (2019-2031)	Annual at Build Out (2031 onwards)
Development charges	$154.8	
Residential	$109.5	
Commercial	$45.3	
Building permit fees	$14.5	
Residential	$10.0	
Commercial	$4.5	
Property taxes		$16.4
Residential		$8.5
Commercial		$7.8

Source: metro economics

Key Findings of Economic Impact Analysis

The above figures indicate direct, indirect and induced GDP and job projections resulting from the 25 projects associated with the health and technology campus. Key findings include:

- Cumulatively, direct, indirect and induced real GDP are projected to total nearly $35 Trillion between 2017 and 2041
- Though slow to start, by 2031 GDP is expected to peak at approximately $1.937 Billion and remain constant at $1.9 Billion between 2031 and 2041
- The less direct the economic driver, the lower the GDP value, with direct GDP in capital expenditures peaking at $996.2 Million in 2030, indirect GDP reaching $521.2 Million, and induced GDP reaching $419.4 Million
- The impact on employment is also expected to peak in 2030 at 19,098 full-time, full year equivalent (FTYE) jobs (including direct, indirect and induced)

- Similarly to GDP, there is an inverse relationship between how direct the job is to the capital investment and the number of people employed, with 9,626 direct FTYE, 5,541 indirect FTYE and 3,910 FTYE jobs in 2030
- During construction phases, development charges can be expected to generate $124.8 million in revenue, while building permit fees will add an additional $14.5 million
- Property taxes from 2031 onward will generate approximately $16.4 million annually from residential and commercial rate payers

4 Best Practices and Case Studies

Best practices were sought in regard to cluster development and community energy planning. These are summarized in turn, with broader discussions of each located in the Technical Appendix.

4.1 Human Health and Sciences Clusters

Two case studies were assessed to glean best practices in building or developing human health and science clusters. Key attributes of each case include the following:

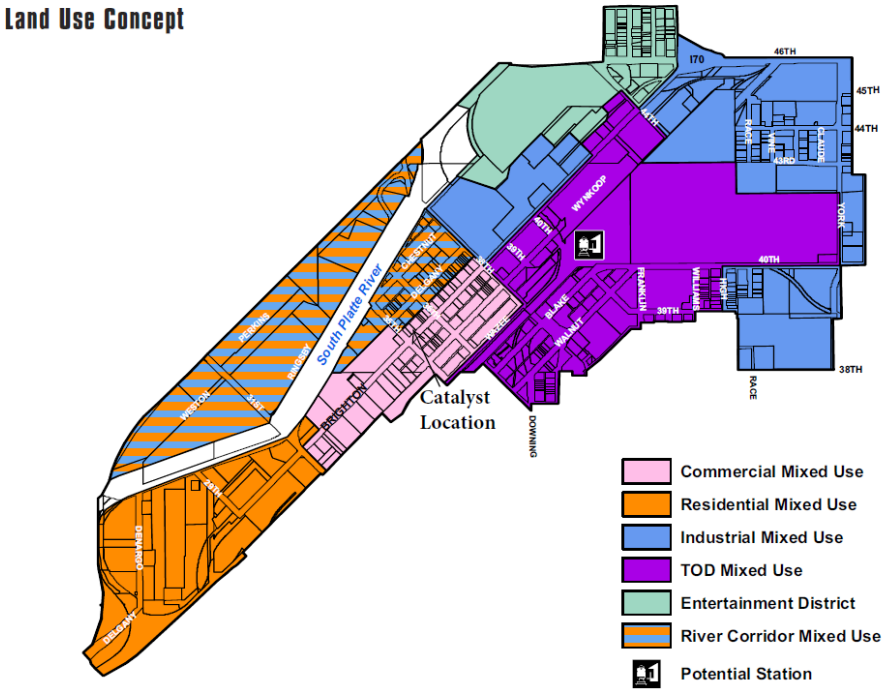
- **Illinois Science and Technology Park (ISTP), Skokie IL** (a suburb municipality of Chicago): This case study is of practical used because of the larger urban centre Skokie is adjacent to, which is similar to Brampton's placement in the GTA. Also of interest is that the municipality intentionally focused its cluster development in an area designated for rejuvenation, which traditionally was largely manufacturing and has transitioned to a variety of human health innovators, developers, product manufacturers and service providers. Skokie Master Plan, which was approved by Skokie's Village Council, sets out a plan for the availability of up to two million square feet of office and laboratory space with five additional office buildings proposed as infill development. Figure 17 provides a visual representation of the ISTP.
- **Health-Tech Innovation Campus, Denver CO**: This is a facility that is currently under development within the River North District of Denver, a neighbourhood in transition northeast of downtown Denver. As the development prepares for opening within the next year, several tenants have been secured for the development, including the University of Colorado's Anschutz Medical School, and the American Diabetes Association. Other tenants are local and national companies within the fields of health care administration, communications, blood research, wearable technology, and data management. The development will also offer features such as 3D Printing and Idea Lab, a venture funding for start-ups, along with onsite restaurants, a workout facility, event and meeting spaces, and more to advance the progress of ideas and action for the healthcare. Denver's comprehensive land use and transportation plan, Blueprint Denver designates this neighbourhood as an 'Area of Change', and the Neighbourhood Plan encourages a vision of mixed-use and transit-oriented development along the river, as well as the road and transportation corridors (see Figure 18).

Both of the case studies show health-focussed developments that are contributing to larger neighbourhood redevelopment. The core best practice associated with these case studies is the notion that each campus is not intended to act as a stand-alone development, but rather a catalyst for broader community and neighbourhood development. This should serve as good resources for Brampton in considering the refinement of design and policy instruments to help spur the redevelopment of the lands surrounding the PMC.

FIGURE 17: ILLINOIS SCIENCE AND TECHNOLOGY PARK SITE LAYOUT

Source: scienceparkillinois.com

FIGURE 18: LAND USE CONCEPT FOR RIVER NORTH NEIGHBOURHOOD WHERE THE HEALTH-TECH INNOVATION CAMPUS IS LOCATED.



Source: Adapted from River North District Plan, City of Denver

4.2 Community Energy Plans and Alternative Energy Systems

Brampton's existing Sustainable Community Development Guidelines provide a framework for policies that support innovative solutions to greening infrastructure and reducing or conserving energy.[22] These objectives dovetail nicely with the desire to see the PMC, and the Human Health and Technology Campus more broadly, being sensitive and considerate of their impacts on the area and the environment. Producing a Community Energy Plan (CEP) would contribute to a stronger linkage between planning, sustainable infrastructure and land use, and could involve the following steps[23]:

- Inventory – defining community energy needs around energy usage and availability. This would require an examination of total energy consumption and costs expended, as well as greenhouse gas emissions by source type (e.g., waste, transportation, or buildings)
- Identification of a pilot project to build community support
- Tactical Planning - developing projections and a year-by-year implementation plan for specific sectors or areas of the community
- Comprehensive Planning – looking at alternative sources of energy delivery for portions of the community, as well as a longer-term plan for reducing greenhouse gas emissions on a community-wide basis

The notion of a CEP is raised because solid planning would enable more progressive and proactive forms of infrastructure and land development grounded in principles of sustainable development. One such infrastructure enhancement is the practice of District Energy. District Energy systems are therefore the context for two case studies. District Energy systems produce thermal energy for distribution from either a centralized facility or a system of smaller facilities placed through the energy network. In most cases in Canada, the facilities are powered by traditional fuel sources (e.g., natural gas or oil), but may also be augmented by alternative and renewable sources (e.g., solar, geothermal, biogas, biomass, waste heat from industrial operations). In some cases, District Energy systems can also convey electrical power, which is known as a Combined Heat and Power (CHP) system.

[22] City of Brampton, Sustainable Community Development Guidelines (2013), p. S14.

[23] Adapted from: Community Energy Association. (2015, January 19). CCEM 101 Energy & Emissions Planning Module 3 – Selecting a CEEP Approach For Your Community.

The two case studies are:

- **Markham, ON**: Through its subsidiary, Markham District Energy Inc. (MDE), Markham operates two CHP systems within the city. The first system came online in 2000 to service buildings within Markham Centre, and required an initial capital investment of $16 Million. Since then, approximately 14 Million square feet of commercial, office, residential and institutional spaces have been added to the system. Demand to connect to the system has been high, and Markham District Energy has installed two additional energy plants, in 2008 and 2010 respectively, with subsequent investments of $14 Million. The corporation, as a municipal subsidiary was also able to leverage a $5.5 Million grant from the Federation of Canadian Municipalities to offset development expenses. The second system operated by MDE services the Cornell District in northeast Markham. The impetus for creating this system was the need for modernization of the boiler, heating, and emergency power generation systems within the Markham Stouffville Hospital. This CHP system, which came online in 2012, also services other municipal infrastructure within the area.
- **Calgary, AB**: Calgary produced a Community Greenhouse Gas Reduction Plan in 2011 which advanced the idea of facilitating District Energy-type systems in new developments. The Downtown East Village is a transitioning neighbourhood within Calgary, bearing resemblance to Brampton's PMC District. As Calgary had previously undertaken several studies to determine an optimal energy strategy for the entire city, it was able to make the decision to introduce District Energy into the East Village redevelopment, with secondary integration into existing high density residential and office/commercial buildings to the west of the redevelopment. Enmax, the City-owned electrical utility, developed a CHP system to supply power and hot water to the area. Currently, fourteen buildings have been connected to the system.

Both of the case studies show that there is the potential for Brampton to consider a District Energy system to service future phases of the PMC Lands and the potential redevelopment of the Precinct. However, prior to the development of such a system, the following issues will have to be considered:

- The system should be part of a greater Community Energy Plan where energy efficiency and savings are considered for the entire municipality
- Brampton should explore the feasibility of developing and implementing a District Energy system in concert with the development of the future university campus to be built in Brampton (ideally within the vicinity of the PMC lands)
- Brampton should explore all avenues of grant assistance from senior levels of government and the Federation of Canadian Municipalities to understand the funding level for future capital budgets
- Brampton should ensure that promotion of the system is done with property developers within the PMC Lands and precinct

5 Recommendations

The following section takes the collective findings that have emerged from the study and presents them as a series of recommendations that are associated with the various components of the report. Recommendations are derived from a number of perspectives to inform the path to developing the health and technology campus. These perspectives include:

- **Development Concept Recommendations**
- **Policy and Planning Development Recommendations**
- **Transit Infrastructure Recommendations**
- **Economic Development Recommendations**

Each of these perspectives is examined in greater detail below. The purpose of this section is to provide a brief rationalization of the necessary steps and/or activities that are important in moving the City of Brampton toward achieving its goal of establishing a Human Health and Sciences Cluster in the city.

4.3 Proposed Development Concept

To support the development of a human health and sciences cluster in the heart of Brampton, the City needs to encourage and facilitate the development of office space and complementary uses in the area surrounding the PMC, with the intent of establishing a “health and technology campus”. Unlike a traditional institutional campus or suburban office park, the health and technology campus would have distinctly urban characteristics and contain a mix of uses, with a concentration of office and institutional uses but also including residential, retail and service uses. In these respects, the campus would function as an extension to Brampton’s downtown and be in keeping with the City’s land use and urban design policies for the area. Concepts for such a campus are illustrated in Figure 5 through **Error! Reference source not found.** above and would have the following k ey features:

- Low-rise, mixed-use office buildings on the PMC Phase 3 Lands. The office space in these buildings would be targeted to start-up and “ramping-up” firms within the cluster but may also include commercial space for health care professionals. The ground floors would contain a mix of health services and commercial amenities.
- Mid-rise office buildings and mixed office-residential buildings on the properties fronting Queen Street, north of the PMC. The mixed-use buildings would have podiums containing 2-5 floors of office space and retail uses on the ground floor, with

residential towers above. Office space would be targeted to established firms within the cluster as well as other complementary tenants, such as financial services and health care professionals. Institutional uses, such as the facilities of a university or college, would also be appropriate and desirable on Queen Street.

- New forms of housing on the east side of Trueman Street, such as townhouses and low-rise apartment buildings, together with an enhanced streetscape, to establish a well-defined edge to the campus. Gradual and "gentle" intensification with additional townhouse developments within the larger neighbourhood is also envisioned.
- A distinctively designed, high-quality streetscape along Lynch Street, with generous boulevards lined with active ground-floor uses (restaurants, shops and services), to create a signature gathering place for those working, learning and living in and around the campus.
- A landscaped public open space on the Phase 3 Lands to provide a place for rest, relaxation and outdoor lunching within the campus.

While businesses within the human health and sciences cluster may choose to locate in various parts of Brampton, concentrating many of the office-based firms within a campus environment will give the cluster a strong physical identity and also encourage cross-pollination among technology-oriented businesses. This type of activity can lead to more innovation and growth within the cluster itself.

As illustrated in the sections above, the concept for the health and technology campus includes approximately 140,000 square metres (1.5 million square feet) of office space and envisions 5,000–6,000 people working on the campus (including PMC and retail employees). There is also the potential to accommodate at least 2,000 residential dwellings. The ultimate amount of development and number of jobs will depend on the success of the cluster and the real estate market.

Kick-Start Project

Building a health and technology campus will require public investments but also rely heavily on private development driven by new and established businesses within the cluster that are seeking homes. The PMC alone may spur additional office development in the area, particularly for health care professionals, but to attract emerging and established firms that are focused on developing and commercializing technologies a catalyst project will likely be needed. Such a project should serve as an "innovation hub" and signal to the world that development of a health and technology campus is underway.

The PMC Phase 3 Lands are the natural location for this type of innovation hub concept. An initial building of 9,000 to 12,000 square metres (100,000 to 130,000 square feet) and four storeys is envisioned. The conceptual program for the building includes a mix of commercial space on the ground floor to accommodate private health services and small-scale retail amenities. The second floor would house a business incubator and accelerator that offers low rents and shared support facilities to entrepreneurs attempting to commercialize new technologies as well as young firms moving from commercialization

to growth. The remainder of the building would comprise leasable office space targeted to ramping-up and established small or mid-size firms within the cluster, with affordable rents used to entice companies currently located in other parts of the region.

If a building of the scale envisioned proves financially challenging to initiate, then a smaller building should be pursued, but it should be at least three storeys and have a floorplate size that provides flexibility to accommodate a range of tenants over the long term. Regardless of the scale of the building, it should be designed and built to the highest standards, since it will be a landmark for the campus and a signifier of the cluster.

The first innovation hub building is expected to require a partnership among William Osler Health System, the Ministry of Health, the City of Brampton and a private developer. The City should work with William Osler to attract a private developer, and the City may become an important tenant in the building if it chooses to operate the incubator space. Once the first hub building is successful, a second office building on the PMC Phase 3 Lands should be pursued, and potentially a third. Given the nature of the PMC, and its focus on "integrated health and wellness", it is also conceivable that other tenants who are from public and non-profit spaces such as social and community based services and agencies should also be approached.

4.4 Policy and Planning Development

The vision for a health and technology campus is generally consistent with the City's land use and urban design policies for the Queen Street East Corridor. However, a number of amendments to the policies are recommended to allow the campus to achieve its full potential and facilitate development in the short-term. In addition, other incentives are proposed to help attract private development and ensure Brampton remains competitive with other GTA municipalities attempting to build up their city centres.

Downtown and Queen Street Corridor Secondary Plans

One of the key selling points to prospective tenants in the health and technology campus will be its proximity to Brampton's downtown, and there will be much interaction and synergy between uses in the city's historic core and those within the campus. Given the inevitable inter-relationships, the proposed health and technology campus should not be seen simply as an employment node within the human health and sciences cluster but also as an extension to downtown. And, from a policy perspective, this suggests that the campus and its immediate surroundings to Kennedy Road should be integrated into the Downtown Secondary Plan. Making such an amendment would recognize the unique context and opportunities associated with the PMC lands and their surroundings, and it would reinforce the importance of improving transportation connections between the future campus and the existing downtown and enhancing the Etobicoke Creek corridor.

Whether or not the boundaries of the Downtown and Queen Street Corridor Secondary Plans are changed, the following policy amendments are recommended:

- Modify the objective to designate the lands at Highway 410 and Queen Street as the primary office node in the Central Area to state that the lands immediately north of the PMC are also intended to become a primary office node. The relevant schedule identifying the primary office node should also be amended accordingly.
- The Central Area Mixed Use designation should continue to apply to the properties on Queen Street, Centre Street and Kennedy Road; however, the density structure along the corridor should be amended to increase the permitted overall maximum density west of Beech Street and Trueman Street to 3.5 FSI and to increase the maximum residential FSI to 2.0. This will allow for mid-rise office buildings and mixed-use development along the corridor generally in keeping with the concept for the campus.
- Amend Section 5.1.3 to clarify that the Queen Street/Highway 410 area is intended to be a primary office node but not the only one. health and technology campus
- Amend Section of 5.4 of the Queen Street Plan or 5.3 of the Downtown Plan, both of which apply to designated Institutional lands, including the PMC lands, to permit office uses on the Phase 3 site. This is necessary to allow the proposed mixed-use innovation hub building.
- To ensure Lynch Street developed as a lively gathering place within the campus, amend the policies applicable to designated Central Area Mixed Use and Institutional area to require active ground-floor uses along Lynch, such as restaurants and retail and service establishments.
- Given the need to have strong pedestrian and bicycle connections between downtown and the future campus, the schedule(s) identifying transportation elements should include a future pedestrian/bicycle bridge over Etobicoke Creek, linking the two ends of John Street.
- In addition to linking Eastern Avenue to Clark Boulevard, there will be a need for new local north-south streets between Queen Street and Eastern/Clark, east of Kennedy Road, to improve access to the future campus and downtown, and to service intensification in the Queen Street corridor. These local streets should be conceptually identified in Schedule B of the Queen Street Plan.

Zoning By-Law

The current zoning in the PMC area generally reflects the existing uses and not those envisioned in the applicable Secondary Plans or the concept for the health and technology campus. This means that developers need to go through often lengthy rezoning processes with uncertain outcomes before they can proceed with new projects. With complex, high-density mixed-use projects, it might be appropriate to put them through a site-specific rezoning to ensure all of the potential impacts are properly reviewed and the public has an opportunity to provide comments. However, for more straightforward, mid-rise developments

permitted by the Secondary Plan, like an office building, the added costs and risks associated with a rezoning process might be enough to kill the project.

To encourage development of the health and technology campus and reduce the timeline for project approvals, the City should amend the Zoning By-law to add an exception to the Service Commercial provisions, as they apply on the blocks fronting Queen Street, between Etobicoke Creek and Beech Street. While maintaining the current permissions, the exception would allow offices uses up to a maximum density of 3.5 FSI and a maximum height of 7 storeys, provided certain performance criteria were satisfied. The criteria would include:

- Maximum front and side setbacks to ensure buildings are built close to the right-of-way (with greater setbacks along Lynch Street);
- Retail or other commercial uses must be provided on the ground floor portions of buildings fronting Queen Street and Lynch Street;
- At least one level of underground parking must be provided and any surface or structured parking must be located at the rear of the building.

If the City would like to understand the transportation impacts of future "as-of-right" office buildings before they are approved, and ensure the impacts will be addressed, it may wish to apply a holding provision to the affected properties, to be lifted only upon submission of a transportation impact study to the City's satisfaction.

Central Area Community Improvement Plan

A Community Improvement Plan (CIP) for the Central Area paves the way for a suite of possible programs that may be used to promote growth and investment in the Central Area. Currently, only the Development Charges Incentive (DCI) program applies to the PMC site and its immediate surroundings. Although the guidelines for this program state that the maximum amount of commercial space eligible for the program is 1,500 square metres per site and 9,000 square metres for any given year, the City intends to remove these caps on office space.

The DCI program is a significant incentive to maintain. However, recognizing new and emerging CIPs that other GTA municipalities are using to attract office development to their downtowns, the City of Brampton should consider implementing other incentive programs to encourage development of the health and technology campus.

A CIP for the Vaughan Metropolitan Centre (VMC) was introduced in 2015 with the aim of attracting office tenants to the city's future downtown. Three financial tools became available: Development Charge (DC) Reductions, Tax Increment Equivalent Grants (TIEG) and Cash-in-Lieu of Parkland (CIL) Reductions. The DC Grant/Reduction applies to major office developments greater than 7,000 square metres and freezes DC rates at the 2013 level. The TIEG program offsets the increase in property

taxes when a site is redeveloped, beginning with a grant equivalent to 70% of the increase in the first year and declining by 7% each year thereafter. The Cash-in-Lieu of Parkland (CIL) Reduction program waives the 2% dedication requirement for all office space and also encourages mixed residential-office buildings by significantly discounting the standard per-unit CIL requirement for every 70 square metres of office space included in the development. Vaughan's three CIP tools are set to remain in force for five years or until the target of 1.5 million square feet of office development is achieved in the VMC, whichever comes first.

The City of Toronto established a City-Wide CIP in 2012 to encourage a range of high-value employment uses in Employment Districts and along transit corridors. To be eligible for the Development Grants program in the CIP, development must be wholly or partially occupied by uses in creative sectors of the economy, such as biomedical, call centres, computer systems designs, creative industries, film studios, incubators, and research and development, among others. Development must have a minimum value of $1,000,000 and add at least 500 square metres of new gross floor area. In addition to these uses, any office building located in a transit corridor outside of the financial district with a minimum GFA of 5,000 square metres is also eligible. The Development Grants program provides annual grants based on a declining percentage of the Municipal Tax Increment (defined as the increase in annual property taxes as a result of investment). Grants equal 100% in the first year of the tax increment and decrease incrementally to 20% by the tenth year.

The City of Mississauga has recently prepared a draft CIP for its downtown that also promotes office development. The CIP's "toolbox" includes a Tax Increment Equivalent Grant (TIEG) Program, a Development Processing Fees Rebate and a Municipally Funded Parking Program. The TIEG Program would be similar to those in other cities. The Development Progressing Fees Rebate would provide a one-time rebate on planning application fees related to official plan amendments, rezonings, minor variances, site plans and plans of subdivision. The Municipally Funded Parking Program would involve the City building and owning a municipal parking facility with the intent of offering spaces at below-market parking rates to office tenants in the downtown. The details of these programs are currently being determined through a public consultation process. To be eligible for the programs, buildings must be at least three storeys and contain at least 5,000 square metres of office space.

Based on what other, competitor municipalities are doing to attract office development, the City of Brampton should implement more incentive programs for the health and technology campus lands, and potentially the broader downtown. A TIEG program similar to Vaughan's or Toronto's should be considered at a minimum. Given that the market for residential development, compared to the market for office development, might continue to remain stronger in Brampton's Central Area, a cash-in-lieu of parkland reduction program like Vaughan's should also be considered. In time, the ongoing need for parking to support office development and the high-cost of structured parking, may prompt the City to explore the cost and benefits of a municipal parking program like the one Mississauga is considering.

The costs of any new CIP programs should be considered before they are implemented. To give the programs time to work and manage their fiscal impacts, they should be tied to a target for office development or given an expiry date of at least five years.

In addition to expanding the incentive programs under its CIP, the City should also encourage Peel Region to support local economic development strategies for centres and corridor by considering a CIP with financial incentives, such as a Regional Development Charges Reduction program. The Region can also encourage development of the health and technology campus by working to advance plans for BRT on Queen Street and improving the streetscape for pedestrians, cyclists and transit users.

4.5 Transit and Transportation Infrastructure

This section contains a series of discussion points that concern opportunities to enhance transit and active transportation in the PMC precinct.

Pedestrian Network

A number of different road configurations are available that in the future would enhance and encourage active transportation within as well as to and from the PMC precinct area. By making these changes it is expected that residents within the area and commuters to it will have greater incentive to avoid using single occupancy vehicles, instead opting for easy to access and safe alternate routes.

It is recommended that they City initiate a feasibility study to improve active transportation infrastructure in ways that enhance safety and accessibility to, from and within the PMC precinct based on consideration of the following alterations modes:

- **Two-way street with enhanced design (i.e. designated bike areas, raised curb sidewalks, etc.)**
- **One-way street (same as above, but on a one way street)**
- **Shared street (Woonerf) (designed with extra breadth, usually on alternatively textured surfaces to help distinguish vehicular and other uses)**
- **Closed street (pedestrians and cyclists only)**

In addition to the improvements and recommendations provided to enhance the pedestrian realm via modifying a series of streets in the precinct, the City should also pursue other improvements to the current pedestrian network itself.

It is recommended that consistent rules and signage be implemented at these primary pedestrian places to minimize conflicts between pedestrians and cyclists.

Examples can be drawn from the City of Vancouver and the McGill University campus in Montreal where various public areas have implemented such regulations. However, it should be noted that these restrictions should only be applied to specific primary pedestrian areas in the precinct.

Public Streets

Pedestrians crossing major streets at unprotected locations are a significant concern. Establishing crossing points at regular locations based on a finer grid road network will improve this condition. There are a variety of crossing types that can be considered based on OTM Book 15. Examples include uncontrolled, controlled, and physically separated facilities. As the finer grid network is established, care should be taken to identify new pedestrian desire lines and ensure that the appropriate crossing types are established in combination with other public realm improvements.

It is recommended that the City establish additional crossing points at regular locations based on a finer grid network.

Laneways and Informal Routes

Another set of proposed improvements concern the laneways and informal pedestrian routes within the precinct. The informal routes exist either as open parking areas or private road ways that do not provide vehicle connectivity across property lines. Some of these laneways will be affected by development concept, and subsumed into the building, but new laneways may also be established. Laneways and informal routes, if viewed as a part of the public realm, can present a significant opportunity to increasing pedestrian connectivity. While, if ignored, will present a significant disincentive to encouraging walking and cycling.

Some challenges to laneways include a lack visual interest or destination attractions, as well as lighting and consistent activity. Public space laneways that are shared between pedestrians and service vehicles should be designed to balance the need for service vehicle functionality, and the facilitation of safe and pleasant pedestrian movement. In all cases, the pedestrian environment of laneways should be reinforced by distinct paving materials and building architecture that addresses the laneways both visually and functionally. The best practices review suggests that laneways can operate as shared public spaces for both pedestrians and service vehicles. **To improve pedestrian circulation along laneways, it is recommended that the City consider the following recommendations:**

- Pave laneways with a material other than asphalt. This could be cobblestone, interlocking, or simply a design with more visual interest than asphalt. The durability of the paving material should be reviewed with respect to need to accommodate heavy truck vehicles at certain laneway locations within the precinct

- Have buildings address the laneway architecturally, through changes to the façade, or the provision of windows or active doors
- Ensure clear lines of sight and vistas so that pedestrians can be guided through the path with a sense of direction;
- Improve the microclimate through the provision of greenery and landscaping
- If it is observed in the future that significant conflicts between pedestrian travel and service vehicles exist within laneway areas, the City can consider restricting large vehicular deliveries to the off-peak hours on laneways where width is a constraint.

4.5.1.1 Bicycle Network

The proportion of precinct users choosing to cycle is expected to increase due to the vision of the development concept as well as other factors. Chief among them is the expansion of cycling infrastructure in the City, and potentially from the recommended public realm improvements to the existing streets within the precinct. The City's ongoing commitment to making the precinct an inviting location for cyclists and active transportation users in general is aimed at reducing the auto mode share and increasing that of cyclists and pedestrians.

It is recommended, with regards to the cycling network and cyclists specifically, that the progress of City initiatives and mode split impacts from the recommended public realm improvements, particularly those along Queen Street, be promoted.

It is also recommended that a system of secondary routes be established within the precinct, particularly along Eastern Avenue, Trueman Street, John Street, and Orenda Road/Orenda Court.

4.5.1.2 Vehicular Network

Recognizing that the precinct currently relies on the movement of vehicular traffic, improvements to the road network have been considered, in such that they will provide flexibility to support transit and active transportation uses in the long-run**. Specifically, the recommendations focus around providing the missing links within the road network and establishing a finer-grid**. **Figure 19 illustrates the recommended road network improvements**.

In particular, the extension of Eastern Avenue between Hansen Road and Rutherford Road is a critical key to the development of the eastern half of the study area. This connection will establish a parallel route to Queen Street, providing relief for travellers to and from the precinct who wish to connect the highway system. This extension will also serve to accommodate the extension of local transit service through this area, which will be discussed in the following section. It is also included as a Short Term

Horizon project in the City's Transportation Master Plan (2015). Further, this project is included in the City's Draft Roads Capital Program and it is understood that the start date for the EA is 2018 with tendering of the project scheduled for 2027. **However, given the critical nature of this link for the development of the precinct, it is encouraged that the City undertake the required Environmental Assessment for its implementation as soon as possible and advance the construction schedule.**

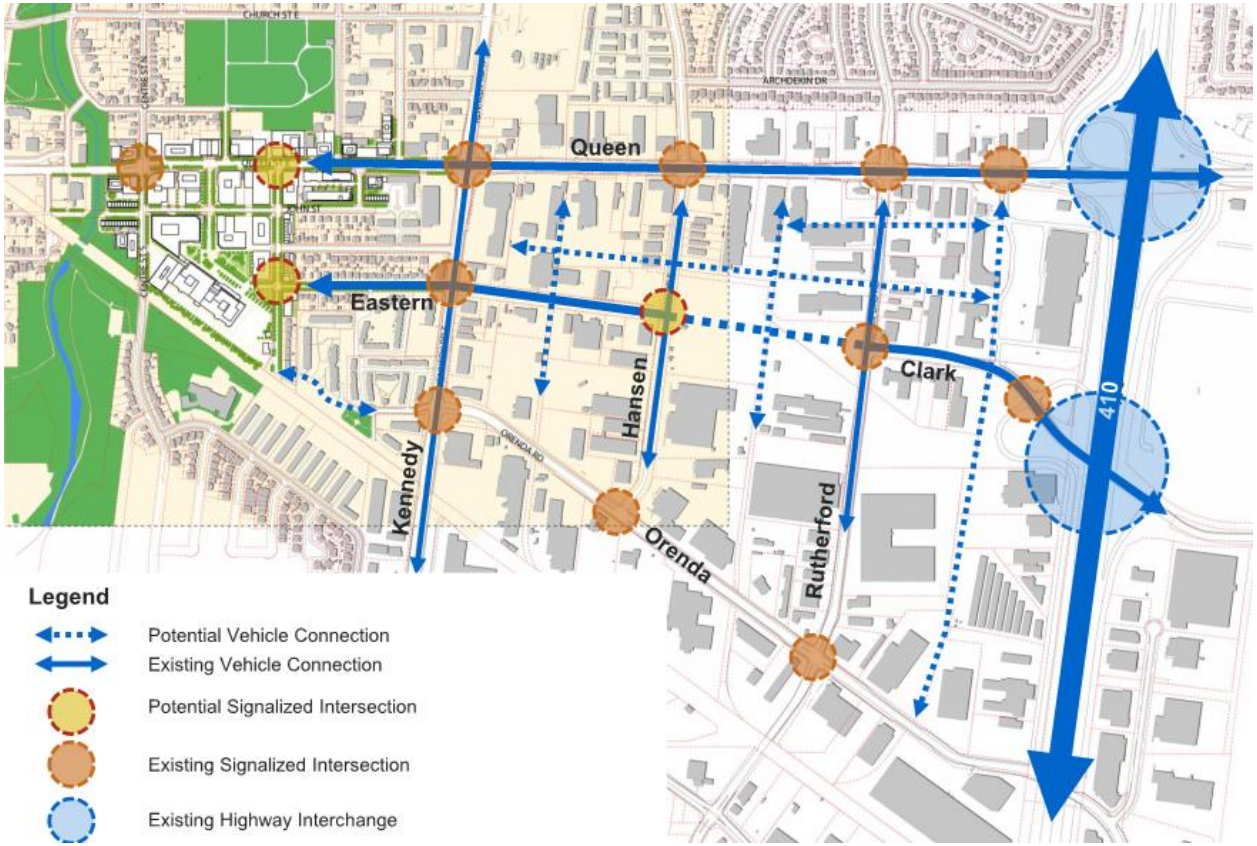
Besides the link along Eastern Avenue, the extension of John Street between James Street and Centre Street (over Etokicoke Creek) as a pedestrian/cycling connection is being considered as part of the ongoing Queen Street Corridor Rapid Transit and the Downtown Mobility Hub studies. Further, this project was included as a recommended transportation network improvement in the City's 2009 Transportation and Transit Master Plan.

It was also identified that there may be an opportunity to connect the southern terminus of Trueman Street with Orenda Court, and by extension of Orenda Road. This would further serve to increase the connectivity of the PMC hospital site providing an additional east-west route. It is recognized that this connection will require an Environmental Assessment to be completed prior to its implementation. The EA should confirm not only the importance of this connection but the potential type of connection (active transportation, transit or vehicles).

Finally, as development occurs east of Kennedy Road, it will be necessary to establish a finer-grid of local roads. In particular, mid-block local roads one between Kennedy Road and Hansen Road, as well as one between Hansen Road and Rutherford Road, should be pursued. It is recognized that establishing a finer grid road network is beginning to be introduced, particularly with the proposed redevelopment of 241 Queen Street East.

Associated with the finer-grid road network should also be additional signalized intersections, the intent of which will be to enhance pedestrian connectivity in addition to facilitating traffic movements. Of particular importance would be to signalize Trueman Street and Queen Street.

FIGURE 19: RECOMMENDED ROAD NETWORK IMPROVEMENTS



4.5.1.3 Transit Network

Facilitating the projected growth within the precinct, it is recommended that alternatives to consider rerouting existing bus service be considered to provide coverage for the area. In particular, the following alternatives should be considered in consultation with Brampton Transit staff:

- **Extension of Route 52/52A to the east**
- **Realignment of Route 1A through the precinct**
- **Provision of a new local route or community-oriented service**

TRANSPORTATION DEMAND MANAGEMENT (TDM)

Besides the above noted infrastructure improvements, it is also recommended that the City take further actions to continue to reduce the auto use in the area. These actions can best be implemented as part of an integrated transportation demand management (TDM) program. A TDM program is recommended for the PMC precinct with two parts:

- **Incentives to increase the attractiveness of alternative modes of transport**
- **Dis-incentives to decrease the attractiveness of driving**

To accommodate a shift in travel mode from auto to other forms of non-auto travel, the priority for the City would first be to invest in upgrading existing non-auto infrastructure and resources—mainly quality bicycle parking and support services. Once the non-auto infrastructure is upgraded to accommodate and attract more users, the disincentive measures of reducing guaranteed parking or maintaining the current supply as population increases, will make a further impact and shift preferred travel modes from auto to non-auto modes.

4.6 Economic Development

A critically important element to the success of establishing (and growing) a human health and science cluster in the City of Brampton is grounded in a sophisticated approach to economic development. Just as an industry cluster requires the deeper interconnection of various businesses that feed into the supply and value chains, and draw from other supports such as educational, research, and institutional entities to foster workforce development, innovation, and growth, the City's staff and leadership must employ a multifaceted approach to relationship building across various touch points in the regional human health and sciences network.

The following recommendations outline various activities or initiatives that should be in place, not only to prepare Brampton in engaging in cluster development, but to maintain ongoing supports that will foster continued opportunity potential for the proposed concepts described in the sections above.

- Provide a dedicated role in economic development responsible for building and maintaining relationships in the Human Health and Sciences sector
    - This should include ongoing connectivity with Toronto Global, T.O. Health, MaRS Discovery District, Sheridan College and the Centre for Advanced Manufacturing and Design, William Osler Health System, local and regional industry, and local property owners and developers, among others
- Establish strong relationships with local and regional companies that have incorporated the new outcomes based model of health into their business models and service or product lines
    - Corporate and industry support for the Health and Technology Campus and cluster development will require business support – both financial and from an optics perspective
    - Seek opportunities to provide forward thinking companies in health and life sciences a platform for showcasing innovations in thought and industry leadership that will also serve as business development opportunities to drive awareness and interest in the City of Brampton, the PMC and the Health and Technology Campus
    - The purpose of this is to encourage greater involvement in cluster development and promote involvement of local anchor companies in health and life sciences
- Establish a plan of action for working with William Osler Health System to activate development on the Phase 3 site
    - This could include developing strategies on how to attract the necessary anchor tenants required to trigger the construction process and what supports the City can provide to move this agenda item forward
    - This activity should be resourced effectively and given priority status as the Phase 3 PMC development concept underpins the centre of the area concept
- Ensure that economic development management and leadership is integrated into all strategic and tactical urban planning and design that touches on the PMC site, The Central Area, transportation and transit, and development along the Queen Street Corridor
- Economic development leadership should participate in, and guide, strategic discussions related to university campus development to ensure that every opportunity is explored to locate the new university campus in proximity and benefit to the Health and Technology Campus (with emphasis on an urban campus and leveraging potential development to meet primary or satellite campus/classroom accommodations)
- Actively work to attract health practitioners and companies looking to nest in an area that is focused on prevention and integrated health delivery

- Relationships with local and regional health networks should be capitalized on to identify health researchers and practitioners looking for opportunities to operate in smaller and more nimble health systems that offer less competition and are focused on applied solutions as opposed to theoretical pursuits

- Develop an international program with targeted countries connected to local ethnic concentrations (e.g., South Asian populations) that correlate with recognized health conditions (heart disease, diabetes, etc.) that represent unique competitive advantages from a research and health delivery perspective
    - Specific emphasis should be placed on identifying and developing relationships with local health, business, and community leaders that have networks with target markets to stimulate discussions around global collaboration and heighten awareness of the City of Brampton's plans
- Once a necessary inventory threshold is reached, work with MaRS and The Discovery District to direct stage two growth companies that have successfully incubated and are looking for affordable and available space in the next two to three years to consider the Brampton Health and Technology Campus as a potential option for location
- Develop a marketing plan (building off of the existing promotional video and efforts) that specifically outlines target audiences, how to reach them, resources required, roles and responsibilities (of staff, elected officials, and partners), and key messaging to ensure a unified and cumulative approach to promoting the human health and science cluster
    - A key focus of this plan should be focused on rebranding Brampton in order to reposition the city away from negative stereotypes and generate new, more positive perceptions in line with attracting talent and opportunity
- Leverage momentum gained from workshops convened for this project and hold semi-regular stakeholder events (including an annual review) to keep community, industry, and government support and interest high and supporters engaged
    - This can be twinned with business retention and expansion related events (geared toward human health and sciences) to allow for networking opportunities. Industry, practitioners, regulators, institutions, community leaders, and entrepreneurs should be invited to encourage collaboration among all facets of health and wellness

6 Implementation Plan

The following section condenses the recommended initiatives and associated actions into a table format that includes a five year timeline. Each of the four strategic perspectives identified in the section above (Development Concept Recommendations, Policy and Planning Development Recommendations, Transit and Transportation Infrastructure Recommendations, and Economic Development Recommendations) are accompanied by their respective recommended initiatives. These are captured in a more abbreviated format than they appear in the section above.

In order to support the implementation planning process, two distinct components appear in the plan; a “champions” and a “prioritization” component. The champion component assigns an action “Lead” to each of the recommended initiatives to clearly identify what department within the City, community stakeholder, or combination of the two is responsible for spearheading or directing action on the item. A “Partners” category is also included and is where various internal (City) and external (non-City) stakeholders and supporters are identified. These partners are seen as integral to the successful execution of the recommended initiative and shows participation is important to its successful achievement.

The prioritization component contains a priority level and an associated timeline (along a five year window). As was discussed in the beginning of this report, there are two tiers in the reports approach: one is the recognition of a longer term vision that sees the city of Brampton taking a leading role in the Health and Human Sciences sector as a hub for applied research and innovation associated with new, and integrated models of health and wellness. The second, is the more immediate approach contained in how this can be launched, or effectively catalyzed through leveraging the new Peel Memorial Centre for Integrated Health and Wellness in the Central Area, and potential contained in positioning Brampton as an attractive location for growth in the Health and Human Sciences space.

The implementation plan below and the associated prioritization component are focused on the latter approach. As such, each of the recommended initiatives is assigned a priority level with an accompanying year along the five year spectrum that represents when the initiative should either be accomplished, or, at the very least begun. The table is structured as a Gantt chart, to make it easier to identify where the various recommendations should be occurring over the timeline, and to assist the City in understanding where and when resources will be required to support these initiatives. Further, in the immediate chart below, it allows the reader to observe overlaps, or potential pinch points where multiple initiatives are suggested to be achieved during similar periods.

Although the implementation plan is a static chart, it should be reviewed annually and treated as a living document that is revised and adjusted as needed in order to reflect current circumstance and accomplishment of objectives as the City moves towards its goal of establishing a human health and sciences cluster in Brampton.

	Recommended Initiatives	Lead	Priority Level (Within x Years)				
			Highest	High	Mid	Long Term	Ongoing
			Now	1	3	3 to 5	
Development Concept							
1	Concentrate office-based firms within a campus environment in order to encourage cluster development	Economic Development					
2	Initiate a “catalyst-project” with WOHS on Phase 3 lands in order to serve as an “innovation hub”	Economic Development					
3	Formulate partnerships between WOHS, Ministry of Health, City of Brampton, and private sector to initiate project	Economic Development					
Planning and Policy Development							
4	Integrate the health and technology campus into the Downtown Secondary Plan	Planning					
5	Designate lands immediately north of PMC as an additional part of the primary office node in the Central Area	Planning					
6	Density structure for mixed use along Queen, Centre, and Kennedy Rd. corridor amended to allow increased density	Planning					
7	Amend Section 5.1.3 to clarify Queen St. / Hwy 410 area is intended to be a primary office node, but, not the only one	Planning					
8	Amend Section of 5.4 of the Queen Street Plan or 5.3 of the Downtown Plan to permit office uses on the Phase 3 site	Planning					
9	Amend Central Area Mixed Use and Institutional Area to require active ground-floor uses along Lynch St.	Planning					
10	Identify transportation elements to include a future pedestrian/bicycle bridge over Etobicoke Creek, linking John St.	Planning					
11	Link Eastern Ave. to Clark Blvd, and plan for new local north-south streets to improve access to the future campus area	Planning					
12	Amend the Zoning By-law to add an exception to the Service Commercial provisions in the subject areas	Planning					
13	Implement more incentive programs for the health and technology campus lands, and potentially the broader downtown	Planning					
14	Encourage Peel Region to consider a regional CIP with financial incentives, such as a Regional DC Reduction program	Planning					
Transit and Transportation Infrastructure							
15	Feasibility study to improve active transportation infrastructure to enhance safety and access to/from PMC precinct	Transportation					
16	Consistent rules and signage be implemented at recommended primary pedestrian places to minimize conflicts between pedestrians and cyclists	Transportation					
17	Public Streets: City establish additional crossing points at regular locations based on a finer grid network	Transportation					
18	Implement laneways and informal routes improvements as prescribed in the recommendations	Transportation					
19	Expansion of cycling infrastructure in the city as per Bicycle Network recommendations	Transportation					
20	Vehicular Network: focus around providing the missing links within the road network and establishing a finer-grid	Transportation					
21	Undertake an EA for a proposed extension of Eastern Ave. between Hansen Road and Rutherford Road and advance the construction schedule	Transportation					
22	Transit Network: strategically reduce auto use in the area by undertaking a Transportation Demand Management program	Transportation					
Economic Development							
23	Dedicated role in economic development responsible for relationships in the Human Health and Sciences sector	Economic Development					
24	Establish relationships with local / regional companies that have incorporated the new outcomes based model of health	Economic Development					
25	Establish a plan of action for working with William Osler Health System to activate development on the Phase 3 site	Economic Development					
26	Ensure that economic development management and leadership is integrated into all urban planning and design	Economic Development					
27	Economic development leadership should participate in / guide strategies related to university campus development	Economic Development					
28	Attract health practitioners / companies looking to nest in an area focused on prevention and integrated health delivery	Economic Development					
29	Develop an international program with targeted countries connected to local, unique competitive advantages	Economic Development					
30	Direct stage two growth companies looking for affordable space in the next 3-4 years to consider Brampton for location	Economic Development					

	Recommended Initiatives	Lead	Priority Level (Within x Years)				
			Highest	High	Mid	Long Term	Ongoing
			Now	1	3	3 to 5	
31	Develop a marketing plan outlining target audiences, how to reach them, and messaging to ensure a unified approach	Economic Development					
32	Leverage momentum gained from this project to keep stakeholder and industry interest high and supporters engaged	Economic Development					

5.1 Implementation Plan

Recommendations and Actions	Champions		Priority (Within *x* Years)				
	Lead	Partner(s)	High-est	High	Mid	Long Term	On-going
			Now	1	3	3 to 5	Once Estab-lished
Development Concept							
1. Concentrate office-based firms within a campus environment in order to encourage cluster development based on a strong physical identity and ability to cross-pollinate among technology-oriented firms	Economic Development	▪ WOHS ▪ Peel RIC Centre ▪ TO Health ▪ MaRS ▪ Discovery District ▪ Toronto Global ▪ Local Health and Human Sciences Industry ▪ Local Development and Real Estate Community ▪ Ministry of Economic Development and Growth ▪ CTCS / Embassies					

Recommendations and Actions	Champions		Priority (Within *x* Years)				
			High-est	High	Mid	Long Term	On-going
	Lead	Partner(s)	Now	1	3	3 to 5	Once Estab-lished
2. Initiate a "catalyst-project" in Phase 3 lands in order to serve as an "innovation hub" and signal to the world that development of a health and technology campus is underway	WOHS and Economic Development	▪ Planning ▪ Mayor's Office ▪ CAO ▪ Peel RIC Centre ▪ LHIN ▪ Local Health and Human Sciences Industry ▪ Ministry of Health and Long Term Care					
3. Formulate partnerships between William Osler Health System, the Ministry of Health, City of Brampton and the private sector in order to initiate the catalyst project	Planning and Economic Development	▪ CAO ▪ Mayor's Office ▪ WOHS ▪ Local Health and Human Sciences Industry ▪ Ministry of Health and Long Term Care					
Policy and Panning Development							
4. Integrate the health and technology campus into the Downtown Secondary Plan, and reinforce the importance of improving transportation connections between the future campus and the existing downtown	Planning	▪ Economic Development ▪ WILL NEED PAUL TO FILL IN PARTNERS					

Recommendations and Actions	Champions		Priority (Within *x* Years)				
			High-est	High	Mid	Long Term	On-going
	Lead	Partner(s)	Now	1	3	3 to 5	Once Estab-lished
5. Modify the objective to designate the lands at Highway 410 and Queen Street as the primary office node in the Central Area to state that the lands immediately north of the PMC are also intended to become a primary office node	Planning						
6. The Central Area Mixed Use designation should continue to apply to the properties on Queen Street, Centre Street and Kennedy Road a. The density structure along the corridor should be amended to increase the permitted overall maximum density west of Beech Street and Trueman Street to 3.5 FSI and to increase the maximum residential FSI to 2.0. b. This will allow for mid-rise office buildings and mixed-use development along the corridor generally in keeping with the concept for the campus	Planning						

Recommendations and Actions	Champions		Priority (Within *x* Years)				
			High-est	High	Mid	Long Term	On-going
	Lead	Partner(s)	Now	1	3	3 to 5	Once Estab-lished
7. Amend Section 5.1.3 to clarify that the Queen Street/Highway 410 area is intended to be a primary office node but not the only one	Planning						
8. Amend Section of 5.4 of the Queen Street Plan or 5.3 of the Downtown Plan, both of which apply to designated Institutional lands, including the PMC lands, to permit office uses on the Phase 3 site	Planning						
9. Ensure Lynch Street development is focussed on generating a lively gathering place within the campus, by amending the policies applicable to designated Central Area Mixed Use and Institutional Area to require active ground-floor uses along Lynch, such as restaurants and retail and service establishments	Planning						
10. Identify transportation elements to include a future pedestrian/bicycle bridge over Etobicoke Creek, linking the two ends of John Street and amend the necessary schedule(s)	Planning						

Recommendations and Actions	Champions		Priority (Within *x* Years)				
			High-est	High	Mid	Long Term	On-going
	Lead	Partner(s)	Now	1	3	3 to 5	Once Estab-lished
11. In addition to linking Eastern Avenue to Clark Boulevard, there will be a need for new local north-south streets between Queen Street and Eastern/Clark, east of Kennedy Road, to improve access to the future campus and downtown, and to service intensification in the Queen Street corridor a. These local streets should be conceptually identified in Schedule B of the Queen Street Plan	Planning						

Recommendations and Actions	Champions		Priority (Within *x* Years)				
			High-est	High	Mid	Long Term	On-going
	Lead	Partner(s)	Now	1	3	3 to 5	Once Estab-lished
12. Amend the Zoning By-law to add an exception to the Service Commercial provisions, as they apply on the blocks fronting Queen Street, between Etobicoke Creek and Beech Street. While maintaining the current permissions, the exception would allow offices uses up to a maximum density of 3.5 FSI and a maximum height of 7 storeys, provided certain performance criteria were satisfied. The criteria include: a. Maximum front and side setbacks to ensure buildings are built close to the right-of-way (with greater setbacks along Lynch Street) b. Retail or other commercial uses must be provided on the ground floor portions of buildings fronting Queen Street and Lynch Street c. At least one level of underground parking must be provided and any surface or structured parking must be located at the rear of the building	Planning						

Recommendations and Actions	Champions		Priority (Within *x* Years)				
			High-est	High	Mid	Long Term	On-going
	Lead	Partner(s)	Now	1	3	3 to 5	Once Estab-lished
13. Implement more incentive programs for the health and technology campus lands, and potentially the broader downtown. Examples include: a. Tying community improvement plan (CIP) accessibility to specific sectors associated with the human health and sciences value chain and creative sectors of the economy b. Initiating a tax increment equivalent grant (TIEG) program c. Development processing fees rebate	Planning	▪ Economic Development ▪ Finance					
14. Encourage Peel Region to consider a regional CIP with financial incentives, such as a Regional Development Charges Reduction program	Planning	▪ Finance ▪ CAO ▪ Mayor's Office ▪ Council					

Recommendations and Actions	Champions		Priority (Within *x* Years)				
	Lead	Partner(s)	High-est	High	Mid	Long Term	On-going
			Now	1	3	3 to 5	Once Estab-lished
Transit and Transportation Infrastructure							
15. City initiate a feasibility study to improve active transportation infrastructure in ways that enhance safety and accessibility to, from and within the PMC precinct based on consideration of the following alterations modes: a. Two-way street with enhanced design (i.e. designated bike areas, raised curb sidewalks, etc.) b. One-way street (same as above, but on a one way street) c. Shared street (Woonerf) (designed with extra breadth, usually on alternatively textured surfaces to help distinguish vehicular and other uses) d. Closed street (pedestrians and cyclists only)	WILL NEED PAUL TO FILL IN LEAD	WILL NEED PAUL TO FILL IN PARTNERS					
16. Develop consistent rules and signage to be implemented at these primary pedestrian places to minimize conflicts between pedestrians and cyclists							

Recommendations and Actions	Champions		Priority (Within *x* Years)				
	Lead	Partner(s)	High-est	High	Mid	Long Term	On-going
			Now	1	3	3 to 5	Once Estab-lished
17. Establish additional crossing points at regular locations based on a finer grid network							

Recommendations and Actions	Champions		Priority (Within *x* Years)				
			High-est	High	Mid	Long Term	On-going
	Lead	Partner(s)	Now	1	3	3 to 5	Once Estab-lished
18. To improve pedestrian circulation along laneways, it is recommended that the City consider the following: a. Pave laneways with a material other than asphalt b. Have buildings address the laneway architecturally, through changes to the façade, or the provision of windows or active doors c. Ensure clear lines of sight and vistas so that pedestrians can be guided through the path with a sense of direction d. Improve the microclimate through the provision of greenery and landscaping e. If it is observed in the future that significant conflicts between pedestrian travel and service vehicles exist within laneway areas, the City can consider restricting large vehicular deliveries to the off-peak hours on laneways where width is a constraint							

Recommendations and Actions	Champions		Priority (Within *x* Years)				
			High -est	High	Mid	Long Term	On-going
	Lead	Partner(s)	Now	1	3	3 to 5	Once Estab-lished
19. Provide the following bicycle network improvements: a. progress of City initiatives and mode split impacts from the recommended public realm improvements, particularly those along Queen Street, be promoted b. A system of secondary routes be established within the precinct, particularly along Eastern Avenue, Trueman Street, John Street, and Orenda Road/Orenda Court							

Recommendations and Actions	Champions		Priority (Within *x* Years)				
			High-est	High	Mid	Long Term	On-going
	Lead	Partner(s)	Now	1	3	3 to 5	Once Estab-lished
20. Provide solutions to missing links within the road network and establish a finer-grid. Examples include: a. Extension of Eastern Avenue between Hansen Road and Rutherford Road b. Connection of the southern terminus of Trueman Street with Orenda Court by extension of Orenda Road c. Finer grids for mid-block local roads one between Kennedy Road and Hansen Road, as well as one between Hansen Road and Rutherford Road							
21. Undertake an Environmental Assessment, particularly for the Eastern Avenue extension; however, to include all relevant road network improvements that result in a finer grid network							

Recommendations and Actions	Champions		Priority (Within *x* Years)				
	Lead	Partner(s)	High-est	High	Mid	Long Term	On-going
			Now	1	3	3 to 5	Once Estab-lished
22. City to take further actions to continue to reduce the auto use in the area. These actions can be implemented as part of an integrated transportation demand management (TDM) program. A TDM program is recommended for the PMC precinct with two parts: a. Incentives to increase the attractiveness of alternative modes of transport b. Dis-incentives to decrease the attractiveness of driving					■		
Economic Development							
23. Provide a dedicated role in economic development responsible for building and maintaining relationships in the Human Health and Sciences sector	Economic Development	■ CAO		■			
24. Establish strong relationships with local and regional companies that have incorporated the new outcomes based model of health into their business models and service or product lines	Economic Development	■ WOHS ■ Sheridan College ■ TO Health ■ Peel RIC Centre ■ Local Industry			■		

Recommendations and Actions	Champions		Priority (Within *x* Years)				
			High-est	High	Mid	Long Term	On-going
	Lead	Partner(s)	Now	1	3	3 to 5	Once Estab-lished
25. Establish a plan of action for working with William Osler Health System to activate development on the Phase 3 site	Planning and Economic Development	▪ WOHS ▪ LHIN ▪					
26. Ensure that economic development management and leadership is integrated into all strategic and tactical urban planning and design that touches on the PMC site, The Central Area, transportation and transit, and development along the Queen Street Corridor	CAO	▪ Economic Development ▪ Planning ▪ Transportation ▪ Transit					
27. Economic development leadership should participate in, and guide, strategic discussions related to university campus development to ensure that every opportunity is explored to locate the new university campus in proximity and benefit to the Health and Technology Campus	CAO	▪ Council ▪ Mayor's Office ▪ Province ▪ WOHS ▪ Steering Committee					

Recommendations and Actions	Champions		Priority (Within *x* Years)				
			High-est	High	Mid	Long Term	On-going
	Lead	Partner(s)	Now	1	3	3 to 5	Once Estab-lished
28. Actively work to attract health practitioners and companies looking to nest in an area that is focused on prevention and integrated health delivery	Economic Development	▪ MaRS ▪ WOHS ▪ Sheridan College ▪ Discovery District (and UHN) ▪ TO Health ▪ Toronto Global ▪ MEDG ▪ CTCS / Embassies ▪ Various Target Universities (e.g., U of T, McMaster, etc.) ▪ Various Target Colleges (e.g., Humber, Mohawk, etc.) ▪ Local Health and Human Sciences Industry					
29. Develop an international program with targeted countries connected to local ethnic concentrations (e.g., South Asian populations) that correlate with recognized health conditions (heart disease, diabetes, etc.) that represent unique competitive advantages from a research and health delivery perspective	Economic Development	▪ Local Health and Human Sciences Industry ▪ WOHS ▪ Ministry of Economic Development and Growth ▪ CTCS / Embassies ▪ Mayor's Office					

Recommendations and Actions	Champions		Priority (Within *x* Years)				
			High-est	High	Mid	Long Term	On-going
	Lead	Partner(s)	Now	1	3	3 to 5	Once Estab-lished
30. Direct stage two growth companies that have successfully incubated and are looking for affordable and available space in the next two to three years to consider the Brampton Health and Technology Campus as a potential option for location	Economic Development	▪ MaRS ▪ Discovery District (and UHN) ▪ TO Health ▪ WOHS ▪ Local Development and Real Estate Community					
31. Develop a marketing plan (building off of the existing promotional video and efforts) that specifically outlines target audiences, how to reach them, resources required, roles and responsibilities (of staff, elected officials, and partners), and key messaging to ensure a unified and cumulative approach to promoting the human health and science cluster	Economic Development	▪ Communications ▪ Mayor's Office ▪ Council ▪ CAO ▪ TO Health ▪ Toronto Global					
32. Leverage momentum gained from workshops convened for this project and hold semi-regular stakeholder events (including an annual review) to keep community, industry, and government support and interest high and supporters engaged	Economic Development	▪ Mayor's Office ▪ Council ▪ Local Human Health and Sciences Industry					

APPENDIX B:
FOCUS GROUP REGISTRATION LIST

Human Health & Science Focus Group
Thursday, November 10, 2016
1:00 – 4:30 pm
City Hall West Tower – 2C & 2D

Format: Presentation, Round Table Discussion and Networking

Purpose: To provide an opportunity for MDB Insight to present the status of their interim report, and gather feedback pertaining to the growth of the Human Health and Science sector and the potential for a hub Brampton's Central Area.

Registration List:

	Last Name	**First Name**	**Company**
	Aldunate	Paul	City of Brampton EDO
	Baccardax	Cassandra	City of Brampton EDO
	Baughan	Lynn	Central West Local Health Integration Network
	Binette	Christian	Region of Peel
	Chisholm	Ainsley	Lai Sing Co
	Chung	Michael	Lai Sing Co
	Debnath	Madhuparna	City of Brampton Urban Design
	Farjou	Jacob	Train Smart Wellness
	Ford	Ann	William Osler Health Centre
	Gautam	Vidya Sagar	
	Haddad	Dana	Ministry of Economic Development and Growth

	Haller	Andrew	TO Health
	Heslegrave	Ron	William Osler Health Centre
	Humphreys	James	Sheridan College
	Kanellopoulos	John	Kallo Developments
	Kanellopoulos	Bill	Kallo Developments
	Korets-Smith	Ella	TO Health
	Leard	Amanda	City of Brampton EDO
	Massey-Singh	Jaipaul	Wise Elephant Family Health Team
	Orlando	Jacqueline	Region of Peel
	Patel	Raj	RPDs
	Rayegani	Farzad	Sheridan College
	Shamim	Badar	Brampton Board of Trade
	Shi	Weiru	
	Sloan	Meaghan	Daniels Health
	Steiger	Bernie	City of Brampton Planning
	Syed	Zain	Mobile Live Inc
	Waters	David	City of Brampton Planning